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Korean EFL Learners' Knowledge of Semantic, Morphological, and Syntactic Properties of English Verbs: The Relationships of Lexical and Grammatical Knowledge

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Korean EFL Learners' Knowledge of Semantic, Morphological, and Syntactic Properties of English Verbs: The Relationships of Lexical and Grammatical Knowledge

by

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Dissertation

Presented to the Faculty of the Graduate School of

the University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

December 2007

To My Parents, Jaeyoon, and Heeyoung

For their patience, support, and love

ACKNOWLEDGEMENTS

The completion of this dissertation would not have been possible without the assistance of a number of people. First of all, I want to give my heartfelt thanks to the participants of this study. Despite their busy schedule, they willingly gave of their time for the test and shared their language learning experience with me.

I also wish to express my deepest gratitude to my co-supervisors, Dr. Elaine K. Horwitz and Dr. Lisa J. Green for their scholarly supervision, warm guidance, and constant encouragement. They provided me with invaluable comments and suggestions as the dissertation developed. Without their careful guidance, this work could not be produced. In particular, I owe an enormous debt of gratitude to Dr. Green who was willing to travel to Austin for my dissertation defense.

I am also indebted to my other committee members: Dr. Thomas J. Garza, Dr. Zena T. Moore, and Dr. Diane L. Schallert, who gave me insightful comments on my work and helped me elaborate this work.

My gratitude also goes to my friends and colleagues who I have met during my years at UT: Kwang-Suk Lee, Hyoun-Sub Kim, Dong-Rhin Shin, Dr. Given Lee, Dr. Jin Huh, Hye Jin Cho, and Hyung-Hwa Chu. I also give my sincere thanks to the members of Korean Catholic Church for their support and encouragement.

Last, but not least, I would like to thank my father, mother, wife, and daughter who have supported me spiritually and financially for the past six years. I dedicate this dissertation to them.

The University of Texas at Austin

August 28, 2007

ABSTRACT

Korean EFL Learners' Knowledge of Semantic, Morphological, and Syntactic Properties of English Verbs: The Relationships of Lexical and Grammatical Knowledge

Publication No. _____

Chang Won Shin, Ph.D.
The University of Texas at Austin, 2007

Supervisors: Elaine K. Horwitz and Lisa J. Green

The purpose of this study was to investigate the relationships between lexical and grammatical knowledge in the L2 acquisition of English by Korean EFL learners by examining how the depth of lexical knowledge that Korean learners have about English verbs is related to their grammatical knowledge. For this study, L2 research into depth of lexical knowledge and generative syntactic theory have been reviewed to suggest the interdependent nature of vocabulary and grammar in L2 acquisition (Nation, 1990, 2001; Chomsky, 1981, 1986, 1995; Herschensohn, 2000).

Data were collected from Korean EFL learners through a depth of vocabulary knowledge test which focused on semantic, morphological, and syntactic properties of English verbs and a grammar test. The results showed that there was a high positive correlation between vocabulary and grammar knowledge in L2 English acquisition by Korean learners, and that semantic, morphological, and syntactic properties of lexical knowledge all contributed to the prediction of L2 learners' grammatical knowledge. In particular, the syntactic property of lexical knowledge was found to be the most important predictor of grammatical knowledge. However, it was also found that the morphological property was not as important in the prediction of L2 grammatical knowledge as the syntactic property.

Based on these findings, it was argued that the in-depth view of L2 lexical knowledge might be appropriate for explaining the interdependent nature of lexical and grammatical knowledge, since this in-depth perspective sees lexical knowledge as consisting of various properties such as semantic, morphological, and syntactic features. On the other hand, a generative view on syntax also seems to provide an account of how each property of lexical knowledge would be related to overall grammatical knowledge. Thus, the syntactic property of word knowledge such as argument structures and subcategorization frames might serve as a connector which links lexical and grammatical knowledge. Finally, some possible accounts of why the morphological property of vocabulary knowledge did not contribute as much to the prediction of L2 grammatical knowledge as the syntactic property were provided on the basis of the

notion of argument structures, the characteristics of morphological knowledge assessed by the in-depth vocabulary test, and L2 lexical development model proposed by Jiang (2000).

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CHAPTER ONE: INTRODUCTION

1.1. Statement of the Problem

Vocabulary and grammar[1] have traditionally been considered two separate subcomponents of linguistic competence that are required for mastering a second language. This attitude towards vocabulary and grammar in language learning and teaching is clearly evident in how language textbooks are organized, how second languages are taught, and how language learner achievement is measured, as pointed out by Hunston, Francis, and Manning (1997).

> Many course books have separate sections on grammar and vocabulary; syllabuses list grammatical structures and key vocabulary items separately; students are described as being 'good at grammar' but having a 'limited vocabulary', or vice versa; grammar and vocabulary are often tested separately. Traditionally, language courses were organized around a set of grammatical points, with vocabulary selected to support the topic of each course unit (p. 208).

Most language teachers and learners seem to accept this dichotomy between the lexical and grammatical components of L2 learning without a clear idea of its theoretical background or its pedagogical implications. Furthermore, Hunston et al. (1997) added that "this artificial divide between vocabulary and grammar … impoverishes the

[1] In this study, the term 'vocabulary' is defined as referring to not only a base word (e.g. *believe*) but also the related words such as inflected forms (e.g. *believed*) and derived forms (e.g. *belief*). Also the terms like 'word (knowledge) ', 'vocabulary (knowledge)', and 'lexical knowledge' will be used interchangeably as referring to the same construct. The term 'grammar' is defined as referring to morphology and syntax in the traditional sense.

teaching of both" (p. 215). On the other hand, the fact that "language courses were organized around a set of grammatical points, with vocabulary selected to support the topic of each course unit," seems to reflect the traditional belief in the relative importance of grammar over vocabulary. In other words, language learners tend to be required to master the basic structures of language first, and then to start building their L2 vocabulary. This relatively neglected status of vocabulary in language learning has been reflected in L2 research. Richards (1976) and Zimmermann (1997) have pointed out that the study of vocabulary has failed to attract attention from L2 researchers in terms of both linguistic and pedagogical theorizing, and L2 research has generally been more focused on the study of grammar or pronunciation[2].

This tendency to distinguish between vocabulary and grammar and to give priority to structural over lexical components seems to reflect the belief that lexical and grammatical knowledge proceed independently in L2 acquisition. That is, L2 learners' lexical development may not influence their grammatical knowledge or vice versa, or L2

[2] Here it should be noted that the shift from the audio-lingual method (ALM) of language teaching to communicative language teaching (CLT), which occurred in the 1970s, opened up the possibility that vocabulary might be the focus of L2 learning, in that CLT emphasized meaning over form (Zimmermann, 1997) and posited that lexical errors might interfere more with communication than grammatical errors (Widdowson, 1978, cited in Zimmermann, 1997). In particular, Wilkins (1974), whose notional-functional syllabus organized the L2 syllabus according to communicative purposes and contexts, noted that vocabulary learning should be considered as important as grammar learning, in that previous grammatical/structural syllabi based on the audio-lingual method gave priority to language structures over meaning (Schulz, 1984; Zimmermann, 1997).

lexical and grammatical knowledge may not be related to each other. However, it is actually the case that many researchers from both L2 learning and theoretical linguistics have implicitly or explicitly suggested the possibility that lexical and grammatical knowledge might be closely associated with each other or that the acquisition of lexical component might play a more crucial role in language learning in general and the construction of L2 grammar in particular (Richards, 1976; Nation, 1990, 2001; Lewis, 1993; Cook, 1994, 1996; Chomsky, 1995; Bogaards, 1996; Hunston et al. 1997; Gass, 1999; Herschensohn, 2000; Singleton, 1999, 2000; Gass & Selinker, 2001; Byrd, 2005)[3]. Among them, it is also worth noting the claims that L2 vocabulary researchers (Richards, 1976; Nation, 1990, 2001) and linguistics-based L2 syntax researchers (Cook, 1994, 1996, 1998; Cook & Newson, 1996, 2007; Herschensohn, 2000) have made about the nature of vocabulary knowledge and the role of vocabulary or lexicon in the development of L2 grammar, respectively. Their studies have provided a theoretical understanding of the interconnection between vocabulary and grammar as well as the relative importance of vocabulary knowledge over grammatical knowledge.

[3] L2 researchers like Lewis (1993), Hunston et al. (1997), and Byrd (2005) have suggested the connection between grammar and vocabulary or the important role of such lexical items as words, collocations, and fixed expressions in L2 acquisition, based on the results from corpus-linguistics. On the other hand, Bogaard (1996) emphasized the relative importance of vocabulary over grammar in language learning, from the perspective of lexico-functional grammar, and Singleton (2000) showed how lexicon and syntax are related in different types of syntactic theories. Cook (1994, 1996) and Herschensohn (2000) focused on the role of lexicon or the acquisition of L2 vocabulary in L2 syntactic construction and Richards (1976), Nation (1990, 2001), Gass (1999), and Gass and Selinker (2001) implicitly mentioned the possibility that different degrees of lexical knowledge also might influence the acquisition of syntactic structures by pointing out that lexical knowledge should include the grammatical information about a given word.

First, it seems that a growing interest in the nature of vocabulary knowledge (Richards, 1976; Nation, 1990, 2001; Gass, 1999; Bogaards, 2000; Gass & Selinker, 2001) and the role of vocabulary knowledge in L2 proficiency development (Qian, 1999, 2002; Qian & Schedl, 2004; Zareva et al., 2005) might lead us to better understand the interdependent nature of grammar and vocabulary and ultimately the relatively greater importance of vocabulary over grammar in second language learning. If we take into consideration what L2 learners should know about a given word to use it appropriately within a sentence, e.g. they might need to know which word should be used with a given word as well as the meaning of the word, it is also plausible to see vocabulary knowledge as being closely associated with how learners construct sentences.

Concerning this issue, Montrul (2001) implicitly stated that lexical and grammatical knowledge might be interdependent by quoting Gass (1999), who views vocabulary learning as a "complex task that involves much more than sound-meaning pairings; it also involves learning how lexical information is morphologically expressed and syntactically constrained"(p. 145). In other words, Gass suggested that lexical knowledge should be considered as containing grammatical knowledge such as the morphological and syntactic properties of given words as well as their lexical meanings. Thus, L2 learners must know these grammatical properties of lexical knowledge in order to produce and comprehend the target language more accurately and fluently. Following Richards' (1976) identification of the "nature of lexical competence" (p. 78), L2 researchers have proposed that there might be different types of vocabulary

knowledge to be acquired by L2 learners: oral/written forms, meanings, morphological features (inflection/derivation), syntactic features (argument structure), collocation, and discourse features (Richards 1976; Nation 1990, 2001; Celce-Murcia & Larsen-Freeman 1999; Bogaards 2000)[4]. Among them, vocabulary knowledge about morphological and syntactic features seems to imply that, if not all, part of grammatical knowledge should be covered in the area of vocabulary learning, not in the area of grammar learning; this in turn suggests that lexical and grammatical knowledge might be intertwined with each other.

Second, this awareness of the interdependent nature of lexical and grammatical knowledge in L2 learning seems to be consistent with the claim that generative syntax (Chomsky 1981, 1986, 1995) has made about the role of the lexicon in the development of syntactic structures in first language acquisition. Chomsky (1995) proposed that cross-linguistic differences in syntactic structures like word order might be accounted for in terms of cross-linguistic differences in the lexicon, rather than in terms of the syntactic differences themselves. That is, the features determining syntactic structures are claimed to be included in the properties of lexical items. When it comes to language learning, this perspective also suggests that the establishment of different L2 grammatical structures might be determined by the successful building of the L2 lexicon,

[4] Although their classifications of the lexical knowledge that L2 learners should have about a given L2 word are somewhat different with respect to the number and types of lexical knowledge, their identifications fundamentally share the same ideas about what it means to know a word.

implying that lexical and grammatical knowledge proceed interdependently (Cook 1996, 1998; Herschensohn 2000).

In sum, vocabulary and grammar as essential factors in language learning were traditionally thought to be separate subcomponents that would be developed independently[5]. Pedagogically, this traditional view on vocabulary and grammar might limit the handling of these two elements in L2 teaching, since the artificial distinction might have language teachers overlook many linguistic properties shared by them. However, L2 research on the nature of vocabulary knowledge and generative syntactic theory might provide theoretical evidence against the prevalent pedagogic belief that L2 learners should acquire vocabulary and grammar separately. Thus, research on the relationships between lexical and grammatical knowledge as well as the role of vocabulary knowledge in the L2 grammatical development might provide new insight on how to deal with these two primary linguistic elements in L2 teaching.

1.2. Significance of the Study

Both L2 research into multiple properties of lexical knowledge and a generative approach to the role of the lexicon in the construction of grammar seem to provide a theoretical understanding of the interdependent nature of vocabulary and grammar. However, despite these theoretical considerations, there have been few empirical studies

[5] Unlike L2 acquisition research, L1 acquisition researchers have paid more attention to the connections between vocabulary and grammar in L1 development and the role of the lexicon in the development of L1 grammar (Bates & Goodman 1999; Cronboy & Thal 2006).

to verify this interconnectivity between lexical and grammatical knowledge in L2 acquisition. The current study is primarily concerned with the investigation of the relationships between vocabulary and grammar in the L2 acquisition of English by Korean EFL learners. Thus, it is expected that this study will provide empirical evidence for or against the interdependent nature of lexical and grammatical knowledge and suggest pedagogical implications on how to deal with vocabulary and grammar in the language classroom. In other words, the examination of how lexical knowledge about target words is associated with the development of L2 grammar might be one possible way of looking at the interdependency of vocabulary and grammar. Moreover, since grammar is one of the subcomponents determining L2 learners' language proficiency, this current study might also help us better understand the role of vocabulary knowledge in L2 proficiency development.

This study also has an important secondary purpose: it should present evidence for the role of depth of lexical knowledge in L2 acquisition. That is, when it comes to L2 lexical knowledge, this study is based on the notion of depth of lexical knowledge, which refers to how well a given L2 word is known. Unlike the more common pedagogic notion of breadth of lexical knowledge (also known as vocabulary size), this in-depth view might provide a more detailed account of why vocabulary and grammar show connections in their development. Depth of lexical knowledge can be represented by multiple properties of lexical knowledge such as spellings/pronunciation,

meanings, morphological features, syntactic features, and collocation[6] (Nation 1990, 2001; Bogaards 2000; Read 2000, 2004). Importantly, depth of lexical knowledge has recently been brought to the attention of L2 researchers who want to examine the relationships between vocabulary knowledge and L2 proficiency (Qian 1999, 2002; Liu & Shaw 2001; Qian & Schedl 2004; Zareva, Schwanenflugel & Nikolova 2005). However, most of these studies have either focused on the relationship between depth of L2 vocabulary knowledge and L2 reading proficiency (Qian, 1999, 2002; Qian & Schedl, 2004) or L2 writing proficiency (Liu & Shaw, 2001), or the relationships between different dimensions of lexical knowledge and overall L2 proficiency (Zareva et al., 2005). The relationships between depth of lexical knowledge and grammatical development remain relatively unexplored.

Finally, the current study will explore the applicability of generative syntax theory to L2 teaching. Generative syntactic theory has been developed in the direction of maximizing the role of lexical properties in construction of syntactic structures. Particularly, the most recent version of this syntactic approach implies that universal properties of syntax do not need to be learned[7], and that what must be learned would be the idiosyncratic lexicon of a particular target language (Cook, 1996, 1998; Herschensohn,

[6] Read (2004) pointed out that there have been three different approaches to depth of L2 vocabulary knowledge: *precision of meaning*, *comprehensive word knowledge*, *network knowledge* (pp.211-212). In this study, the comprehensive view is taken as a tool to understand and operationalize the construct of depth of vocabulary knowledge. More detailed discussion of this issue will be given in section 2.1.1.2.

[7] Here, the claim that 'cross-linguistically identical aspects of syntax might be innate in all human languages is consistent with the claim that UG (Universal Grammar) is fully accessible even in L2 learning (Schwarz and Sprouse, 1994, 1996; White, 2003b).

2000). Thus, the universal principles that all human language have in common are assumed to be innately given, and the lexicon is claimed to have all the language-specific information on semantics, morphology, and syntax. Although this theoretical evolution has suggested that the acquisition of lexical knowledge might be closely tied to grammatical development in both L1 and L2 acquisition (Cook, 1996; Herschensohn, 2000), there have been few studies on the applicability of this theoretical approach to L2 teaching. Thus, the current study might shed light on the role vocabulary plays in L2 teaching by examining the interconnections between lexical and grammatical knowledge.

1.3. Korean EFL Learners

To investigate the relationships between vocabulary and grammar, the current study focused on Korean EFL learners and their lexical knowledge about English verbs, because Korean is typologically different from English in the grammatical structures related to verbs and these Korean learners of English were thought to offer an opportunity to examine the questions posed in this study. Verbs are generally thought to play a key role in determining the basic structures of sentences. Haegemann (1991) pointed out that the argument structures of verbs determine the obligatory elements of a sentence. That is, the minimally required element(s) of a sentence will be decided by the verb used in the sentence. For instance, the verb *meet* must take two elements – one subject and one object, as in *John meets Hailey vs. *John meets/ *meet Hailey*, while the verb *smile* need one subject only as in *John smiled vs.*John smiled Hailey.* Since this important

role of verbs in sentence structures was expected to have a major effect on Korean EFL learners' grammatical knowledge, the current study was concerned with their lexical knowledge about English verbs.

Specifically, Korean is typologically different from English with respect to the object position of verbs: Subject-Object-Verb (Korean) vs. Subject-Verb-Object (English) (Kim, 1987). Korean and English also show typologically different characteristics with respect to the relative position of verbs and other elements (Heine, 1975). Thus, English tends to show word orders such as Verb + Direct Object+ Indirect Object, Verb + Adverbs, Noun + Relative Clause, Auxiliary Verb + Main Verb, Negative + Verb, and so forth. On the other hand, Korean tends to have the opposite word orders such as Indirect Object + Direct Object + Verb, Adverb + Verb, Relative Clause + Noun, Main Verb + Auxiliary Verb, and Verb + Negative. That is, since Korean and English are typologically different in the grammatical structures related to verbs, it seems to be important for Korean EFL learners to have specific lexical information about not only the argument structures of English verbs but also the relative position of verbs and other elements. Thus, the relationships between Korean learners' lexical knowledge about English verbs and their grammatical knowledge of English will be a good starting point for exploring the interdependent nature of lexical and grammatical knowledge.

1.4. Goals of the Study

The major concern of this study is to investigate the interconnections between

lexical and grammatical knowledge in L2 acquisition. Based on L2 vocabulary research into various properties of lexical knowledge and generative syntactic theory, the current study sought to explore how lexical and grammatical development in L2 acquisition might proceed interdependently. That is, unlike traditional approaches to language learning and teaching, this study took the position that lexical knowledge also includes grammatical aspects such as morphological and syntactic features of words. Therefore, the purpose of this study was to test claims about relationships between vocabulary and grammatical knowledge in L2 acquisition. Specifically, it examined whether L2 learners' depth of lexical knowledge as well as their corresponding grammatical knowledge were correlated, as predicted by L2 research into depth of lexical knowledge and a generative approach to syntax.

Thus, this study (1) investigated the relationships between lexical and grammatical knowledge in the L2 acquisition of English by Korean EFL learners by examining how the depth of lexical knowledge that Korean learners have about English verbs is related to their grammatical knowledge, (2) determined which properties of lexical knowledge contributed most to the prediction of Korean adult EFL learners' overall grammatical knowledge, and (3) explored the applicability of both L2 research into depth of lexical knowledge and generative syntactic theory to L2 teaching.

CHAPTER TWO: REVIEW OF THE LITERATURE

2.1. L2 Vocabulary Knowledge

2.1.1. Studies on L2 Vocabulary Learning

Although vocabulary is regarded as an essential element in L2 learning, less attention has been paid to the theoretical establishment of vocabulary learning than that of L2 grammar learning (Richards, 1976; Zimmerman, 1997). However, there has recently been a noticeable increase in L2 research into vocabulary learning. The L2 vocabulary research has mainly dealt with the issues like 'what it means to know a word?' and 'how words are learned and how they are used?' That is, L2 vocabulary research has been devoted to the identification of lexical knowledge and the memorization, storage, and retrieval of lexical knowledge (Carter, 2001).

The first question 'what it means to know a word' is related to how well a given word is known by learners. In other words, vocabulary learning might not only refer to sound-meaning pairings, but also incorporate something more than memorizing L1 equivalents, since, as pointed out by some L2 researchers (Nation, 1990, 2001; Celce-Murcia & Larsen-Freeman, 1999; Gass, 1999; Bogaards, 2000), there might be various properties of lexical knowledge that L2 learners should have in order to comprehend or produce the target language in a native-like way. The fact that L2 learners should have various types of lexical knowledge in turn indicates that they must have in-depth knowledge of a given L2 word. This concern has led many L2 vocabulary researchers

to distinguish between 'how many words L2 learners know' (breadth of lexical knowledge) and 'how well a given word is known' (depth of lexical knowledge) (Read, 1993, 1998, 2000; Schmitt, 1994; Wesche & Paribakht, 1996; Qian, 1999; Qian & Schedl, 2004; Henriksen, 1999; Vermeer, 2001). If we admit the importance of learners' in-depth knowledge of vocabulary as well as the importance of their vocabulary size, the second question about 'how words are learned' might be understood as how to enlarge learners' vocabulary size and how to deepen their lexical knowledge.

With regard to the acquisition of L2 vocabulary knowledge and its use, on the other hand, we also need to distinguish between receptive (passive) and productive (active) vocabulary knowledge, since these types of lexical knowledge – receptive vs. productive - require different amounts of learning time, different effects on vocabulary acquisition, and different learning methods (Stoddard, 1929; Waring, 1997; Laufer & Paribakht, 1998; Nation, 2001; Mondria & Wiersma, 2004; Webb, 2005).

This section will first discuss previous research on receptive vs. productive lexical knowledge and its use, and then focus on the differences between breadth and depth of vocabulary knowledge in order to emphasize the need to pay more attention to depth of lexical knowledge in L2 learning. Finally, an L2 lexical development model proposed by Jiang (2000) will be presented to make predictions about how each property of lexical knowledge would be developed. Consequently, this discussion about L2 vocabulary learning will help us understand not only what the nature of lexical knowledge is but also what L2 lexical development looks like.

2.1.1.1. Receptive vs. Productive Vocabulary Knowledge

One of the dimensions by which L2 learners' vocabulary knowledge has been investigated is the receptive vs. productive distinction[8]. Nation (2001) refers to receptive vocabulary use as recognizing the spoken or written form of a given word and retrieving its meaning to comprehend a spoken or written text, and productive vocabulary use as retrieving and producing an appropriate spoken or written word form to express a message. Receptive use of lexical knowledge might be linked to listening and reading skills, while its productive use might be closely related to language production like speaking and writing.

Nation (1990, 2001) suggested how each property of vocabulary knowledge such as form, meaning, position, and function can be understood in terms of this receptive and productive distinction. First, with respect to the form of a word, learners need to have receptive knowledge of what the word sounds like, what the word looks like, or what parts the word consists of (e.g. the word *underdeveloped* is composed of *under-*, *develop*, and *–ed*) while they also need to become familiar with productive knowledge of how the word is pronounced, how the word is spelled, or how the word is combined with other word parts. Second, receptive knowledge about word meaning might include retrieval of the meaning of a given word form, recognition of the concept behind the word, and awareness of related words (e.g. the related words of *underdeveloped* might

[8] Some researchers used the terms *passive* vs. *active* vocabulary as synonyms for this distinction (Meara, 1990; Corson, 1995).

be *overdeveloped*, *backward*, and *challenged*). If this aspect of word knowledge might be described in relation to production, it should be understood as production of correct word forms to express an intended meaning, ability to produce other word forms in different contexts to express the concept, and production of related words. Third, if L2 learners want to have receptive knowledge about grammatical or collocational features of a target word, they should be able to recognize the patterns in which the word occurs and which words are used with the word (e.g. words such as *territories* and *areas* are used with the word *underdeveloped*). In terms of production, however, this kind of vocabulary knowledge might be concerned with learners' ability to use a word in correct structural patterns and to produce other words that commonly occur with a given word. Finally, the functional aspects of vocabulary knowledge such as frequency and appropriateness might include receptive knowledge about the expectation of how often a given word is used and the recognition of where and when the word is used, as well as productive knowledge like learners' decisions on how often the word should be used and where and when the word should be used (e.g. some people dislike the word *underdeveloped* and prefer to use the word *developing*). Consequently, it seems that various types of lexical knowledge might have different interpretations in relation to this distinction between receptive and productive lexical knowledge and its use.

In general, productive vocabulary use is considered to be more difficult than receptive vocabulary use, even though the specific reasons for this relative difficulty of productive use have not yet been discovered (Nation, 2001). Ellis and Beaton (1993)

proposed three possible complementary accounts of it. First, vocabulary use for productive purposes might require more precise knowledge of the word form than for receptive purposes. Thus, more accurate knowledge about spellings and sounds might be needed to produce correct spoken or written forms, while only a few features of spellings or sounds might be required to recognize a given word form. Second, at least in the initial stage of language development, the receptive direction from L2 words to L1 equivalents might be one simple association with L1 translation such as *leg* (L2 word) → *tari* (L1 Korean equivalent), while the productive association with L1 and L2 words might have many possibilities like *tari* (L1 word) → *leg*, *tari* (L1 word) → synonyms of *leg*, and *tari* (L1 word) → collocates of *leg*. This asymmetrical relationship shown in receptive and productive vocabulary use might be one of the factors that make production of a word more difficult than its reception. Finally, another possible reason would be that language learners can have more time to practice receptive use of vocabulary, which might also give rise to the differences in receptive and productive vocabulary size.

With respect to the learning process for receptive and productive vocabulary use, Mondria and Wiersma (2004) claimed that receptive learning is less difficult than productive learning, since receptive learning requires less time than productive learning, and receptive retention tests result in a better performance than productive retention tests. Laufer and Paribakht (1998) also mentioned that receptive vocabulary knowledge is learned faster than productive vocabulary, and thus receptive vocabulary is usually

larger than productive vocabulary.

The type of test – receptive vs. productive test - has also been found to show the same relative difficulty as that of learning and vocabulary knowledge. Two similar studies (Stoddard, 1929; Waring, 1997) on the effect of receptive vs. productive learning on different test types indicated that receptive tests using recognition items are easier than productive tests using recall items. These studies also showed that when learning types and test types are identical, L2 learners performed better on each type of vocabulary test than when learning and test types are different. In other words, those who learned receptively got higher scores on the receptive test than those who learned productively, and those who learned productively got higher scores on the productive test than those who learned receptively. Thus, it might be more effective that language teachers adopt productive learning methods for enhancing productive aspect of vocabulary use such as speaking and writing and receptive learning methods for developing learners' ability to use vocabulary receptively (Nation, 2001).

The current study will focus on the receptive aspect of vocabulary knowledge as the first step toward examining the interdependent nature of vocabulary and grammar knowledge. Since the receptive vocabulary knowledge was found to be different from the corresponding productive one with respect to the difficulty of its use, learning, and testing, it is reasonable to distinguish between these two aspects of vocabulary knowledge and to look at the relatively easy aspect of vocabulary knowledge, i.e. receptive vocabulary.

2.1.1.2. Breadth vs. Depth of Vocabulary Knowledge

Another dimension by which vocabulary knowledge and its use have been considered is the distinction between the breadth and depth of vocabulary knowledge (Read, 1993, 1998, 2000, 2004; Schmitt, 1994; Wesche & Paribakht, 1996; Qian, 1999; Qian & Schedl, 2004; Henriksen, 1999; Vermeer, 2001). Anderson and Freebody (1981) presented the following influential definitions of the distinction between the two aspects of word knowledge, based on L1 vocabulary research:

> The first may be called 'breadth' of knowledge, by which we mean the number of words for which the person knows at least some of the significant aspects of meaning..…. [There] is a second dimension of vocabulary knowledge, namely the quality or 'depth' of understanding. We shall assume that, for most purposes, a person has a sufficiently deep understanding of a word if it conveys to him or her all of the distinctions that would be understood by an ordinary adult under normal circumstances (pp. 92-93, cited in Read, 2004).

Thus, breadth of vocabulary knowledge representing 'vocabulary size' refers to the number of words for which L2 learners have at least partial knowledge (Qian, 1999, p 283). In other words, this position about vocabulary knowledge is primarily concerned with how many words L2 learners know, rather than how well a given word is known by L2 learners. However, it should be noted that this quantity-based view tends to focus solely on form-meaning pairings among many other properties of lexical knowledge that L2 learners should have. That is, whether a target word is known by learners seems to be determined by only one property of lexical knowledge, i.e. word

meanings (Schmitt, 1994). Therefore, this breadth-based perspective might give rise to the question as to whether large vocabulary size necessarily means having native-like lexical competence. This inadequacy of the quantity-based perspective to fully represent L2 lexical knowledge might lead us to think that other properties of lexical knowledge such as morphological, syntactic, or discourse knowledge of a given target word also need to be covered in L2 vocabulary research[9].

In this regard, as mentioned earlier, there have been many attempts to identify and classify various properties of vocabulary knowledge, and thus how many properties of lexical knowledge L2 learners have about a target word has been proposed as one possible way of compensating for inadequacy of the quantity-based view in representing and assessing L2 learners' lexical knowledge. This dimension of lexical knowledge is also known as depth of vocabulary knowledge, which has been adopted as a complementary concept to breadth of lexical knowledge (Schmitt, 1994; Wesche & Paribakht, 1996; Bogaards, 2000).

However, the question still remains as to which types of vocabulary knowledge should be included in order to represent the depth of lexical knowledge that L2 learners

[9] This recognition of the nature of word knowledge also seems to be consistent with that of the 'complexity of word knowledge', which was presented in L1 vocabulary research (Nagy & Scott, 2000). In particular, among many aspects of this complexity, 'multidimensionality', which means that 'word knowledge consists of several qualitatively different types of knowledge (p. 270)', can be understood as a similar concept to depth of vocabulary knowledge adopted in this study.

are presumed to have in their L2 lexicon[10]. While addressing the question of what it means to know a word, many L2 researchers have proposed various properties of vocabulary knowledge which should be included in a so-called list of L2 lexical knowledge (Cronbach, 1942; Richards, 1976; Nation, 1990, 2001; Celce-Murcia & Larsen-Freeman, 1999; Boggards, 2000; Cook, 2001)[11]. Even though they did not explicitly mention the notion of depth of lexical knowledge in their research, the various properties identified by them can be used as some kind of criteria for measuring depth of learners' lexical knowledge. In other words, how well a given word is known by L2 learners can be operationalized by how many properties of lexical knowledge they acquire (Schmitt, 1994; Qian, 1999; Jiang, 2000). This kind of conceptualization of depth of lexical knowledge also refers to a comprehensive view of depth of lexical knowledge (Read, 2004)[12]. Following this comprehensive perspective on depth of lexical knowledge, Qian (1999) attempted to use both morphological and collocational features of English words in order to assess depth of lexical knowledge necessary for reading comprehension.

Besides the most influential classification of lexical knowledge proposed by

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[10] In fact, it should be noted that most of the discussions about multiple properties of lexical knowledge have taken place in relation to language testing, specifically which properties of word knowledge should be included in assessing learners' depth of word knowledge.

[11] Although various properties of lexical knowledge that they have proposed are not exactly identical, it seems that they are overlapped and complementary to each other (Bogaards, 2000, p. 491).

[12] He also pointed out that there have been two other approaches to operationalizing the construct *depth of lexical knowledge,* such as 'precision of meaning' and 'lexical network knowledge' (Read, 2004, pp.211-212)

Nation (1990, 2001), Boggards (2000) also put forward the following taxonomy of vocabulary knowledge: spoken or written form, meaning, morphological knowledge, syntactic knowledge, collocation, and discourse knowledge[13]. This identification of lexical knowledge seems to be more appropriate for creating a comprehensive in-depth vocabulary test focusing on word meaning, morphological, and syntactic properties of lexical knowledge than Nation's (1990, 2001) classification into form, meaning, position, and function. That is, the clearly defined linguistic terms like morphological and syntactic knowledge seems to make it easy to create the test items, compared with the terms like form or position used by Nation's (1990) identification. Here are detailed explanations of semantic, morphological, and syntactic properties of lexical knowledge that will be in relation to the current study.

First, L2 learners should have knowledge of the semantic property of a target word, and such semantic knowledge is seen as a matter of degree rather than the dichotomy between 'yes' and 'no'. Thus, there might be differences among L2 learners in the extent to which they know about a given word, and it is impossible that L2 learners know everything about a given word like various meanings (e.g. the verb *commit* has the following multiple meanings like *to do something wrong or illegal*, *to make*

[13] The original taxonomy of lexical knowledge listed in Boggards (2000) is as follows: form, meaning, morphology, syntax, collocates, and discourse. However, they were modified (e.g. *morphology* → *morphological knowledge*) in order to make it clear for this term to refer to one type of lexical knowledge. On the other hand, when Bogaards (2000) presented this list of multiple properties of lexical knowledge, he preferred to use 'lexical unit' instead of 'word', since he claimed that 'word' is not a clear concept for including linguistic forms like phrasal verbs, which behaves like other words semantically and grammatically.

someone agree or promise to do something, and *to say you will use available things or people for a particular purpose*) associated word forms (e.g. *commit* is associated with *do, carry out*, and *promise*), and their semantic differences.

Second, morphological knowledge is divided into derivational and inflectional knowledge[14]. The former refers to knowledge of derivational morphemes associated with a given word. Thus, this type of morphological knowledge helps L2 learners comprehend the content meanings of the derivatives of a given word and produce appropriate derivative forms to represent intended content meanings. For example, the prefix *un* – can give the opposite meaning to certain adjectives as shown in *important* → *unimportant.* On the other hand, inflectional knowledge is about inflectional morphemes of a given word and can be used for understanding grammatical functions of the inflected forms of a given word and producing an appropriate inflected form to mark a certain type of grammatical function. For instance, the addition of the inflectional morpheme *–ed* to a verb makes the verb denote past tense. With respect to this morphological knowledge of a word, it has been pointed out that productive use of morphological knowledge is a more difficult task to master than its receptive use (Bogaards, 2000; Hawkins & Liszka, 2003; White, 2003b)[15].

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[14] Originally, Boggards (2000) did not include inflectional knowledge in morphological knowledge, but since the inflection conveys important grammatical meanings like tense, agreement, and number, it should be covered in the area of morphological knowledge.

[15] It has been well recognized that "L2 learners exhibit optionality or variability in their use of verbal and nominal inflection and associated lexical items. Morphology relating to tense, agreement, number, case, gender, etc., ….. are sometimes present and sometimes absent in

Third, syntactic knowledge about how a given word behaves within a sentence might also play a crucial role in L2 learning. Cook (2001) identified argument structures as basic syntactic knowledge that L2 learners should have about verbs, since these are related to the sentence structures - how many or what types of arguments should or can occur with a verb in a particular meaning. Bogaards (2000) also pointed out that which prepositions should come with a given verb or adjective in a given meaning is important syntactic knowledge about a given word. In sum, this identification of lexical knowledge implies that L2 learners might need to integrate various properties of lexical knowledge in their L2 vocabulary learning so that they can have in-depth L2 lexical knowledge.

In conclusion, depth of lexical knowledge as well as vocabulary size should be taken into consideration to represent L2 lexical knowledge that learners need to have in their language learning. This notion of depth of word knowledge can be represented by the various properties that L2 vocabulary researchers have identified as lexical knowledge. The current study will be primarily concerned with this quality-based view on L2 vocabulary knowledge, since it is expected that the various properties representing depth of lexical knowledge might provide a more detailed account of the connections between vocabulary and grammar. The following section will present a model of L2 lexical development proposed by Jiang (2000), which will give us insight

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spontaneous production data" (White, 2003, p. 178). Particularly, as discussed in Hawkins & Liszka (2003), even advanced L2 English learners continue to show some problems with using simple past tense marker *–ed* in their spontaneous oral production.

into how L2 vocabulary would be developed in relation to the different acquisition order of various properties of lexical knowledge.

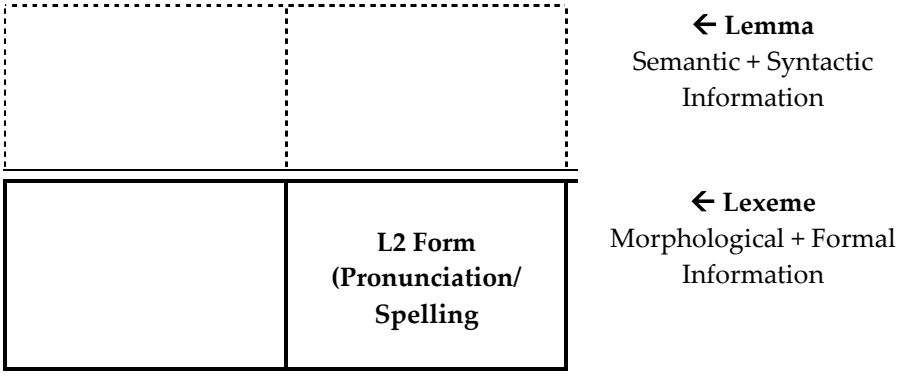
2.1.1.3. Three Stages of Lexical Development in Second Language

Jiang (2000) proposed that L2 lexical development might be represented as the following three stages: formal stage, L1 lemma mediation stage, and L2 integration stage. This model was established based on how each aspect of lexical knowledge would be developed. He also claimed that there might be two prominent limitations of L2 vocabulary acquisition, especially distinctive in classroom-based language learning: insufficient L2 input for obtaining native-like semantic, morphological, or syntactic information of a given target word and the presence of the L1 semantic system, specifically in the case of L2 adult learners. These two constraints seem to bring about some differences in the development of L1 and L2 vocabulary acquisition. In particular, the second constraint implies that, at least in the initial stage of lexical development, L2 learners tend to focus on the forms of a new L2 word, rather than its semantic aspect, since they already have their own L1 semantic system on which they can rely in their conceptual understanding of a new target word.

Thus, the first stage of L2 vocabulary development might be described as a 'formal stage', which indicates that L2 learners may start off with more attention to formal information about lexical items such as spelling and pronunciation than to semantic, morphological, and syntactic information about L2 word, as illustrated in

Figure 2.1.

Figure 2.1: Lexical representation at the formal stage (Jiang, 2000, p 51)

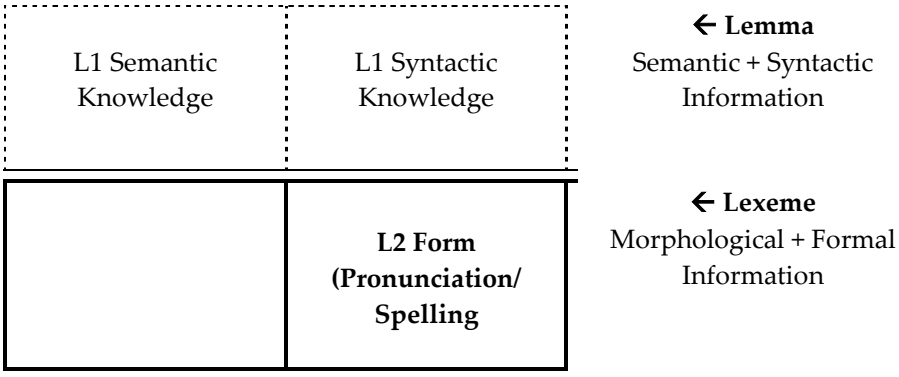


Thus, in this initial stage L2 learners seem to have a limited amount of semantic, morphological, and syntactic information about L2 vocabulary, which might be activated through the associations between L1 and L2. Thus, lexical entries at this stage might consist of not only L2 lexical forms but also semantic and syntactic information about L1 translation equivalents.

Next, repeated use of the receptive and productive link between L2 lexical forms and L1 lemma[16] information in this initial stage might lead to the next stage of lexical development called an 'L1 lemma mediation stage' as shown below.

[16] Following Garret (1975) and Levelt (1989), Jiang (2000) used the terms the lemma and the lexeme to refer to two components of a lexical entry. He mentioned that "the lemma contains semantic and syntactic information about a word, for example, word meaning and part of speech, and the lexeme contains morphological and formal information, for example, different morphological variants of a word, spelling and pronunciation (p.48)".

Figure 2.2: Lexical representation at the L1 lemma mediation stage (Jiang, 2000, p 53)

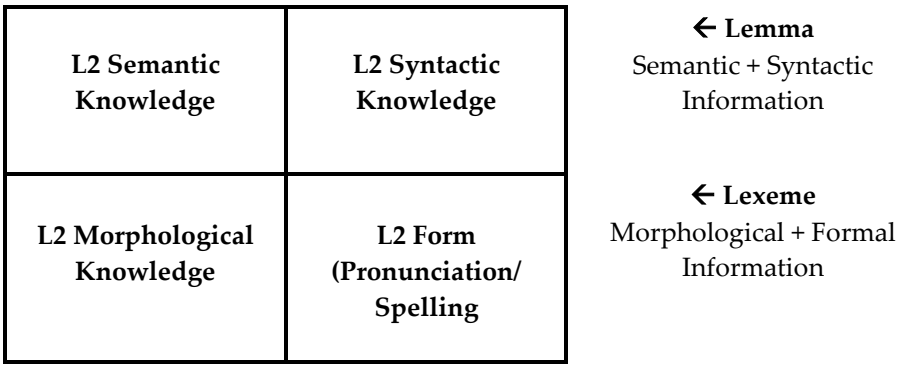


This second stage might be characterized as strong associations between L2 formal specifications and L1-mediated lemma information, but as weak links between L2 lexical items and their conceptual representations, which might be due to the loss of L2 lemma information in transfer from L1 to L2 lexicon. In addition, it is suggested that the lexical entry in this stage might not have morphological information, since language-specific morphological information might be more difficult to master than semantic information showing cross-linguistic similarities[17].

In the final stage, which is called an L2 integration stage, the formal, morphological, semantic, and syntactic specifications about an L2 word might be established in the L2 lexicon, and that learners' L2 lexicon might become identical to their L1 lexicon. That is, the representation of L2 lexicon gets to have the same characteristics as those expected for L1 lexicon as illustrated in Figure 2.3.

[17] As pointed out in the previous section, it seems that this claim about the relative learning difficulty of morphological information is also consistent with the point made about the relative difficulty in the productive use of the English simple tense marker *–ed*. See Note 15 for relevant discussion.

Figure 2.3: Lexical representation at the L2 integration stage (Jiang, 2000, p 53)



Finally, it should be noted that there might be the following similarity between the three stages of L2 lexical development and the notion of in-depth lexical knowledge. Thus, the types of information required for the final stage seems to be very similar to all the properties of lexical knowledge necessary for having native-like depth of lexical knowledge. That is, the L2 integration stage as a final step suggests that L2 learners should have formal, semantic, morphological and syntactic knowledge of a target word, and the multiple properties required for having in-depth lexical knowledge have also been identified as form, meaning, and morphological and syntactic knowledge in many L2 vocabulary relevant studies (Richards, 1976; Nation, 1990, 2001; Bogaards, 2000).

In sum, Jiang's (2000) model of L2 lexical development was established on the basis of not only which type of L2 lexical knowledge would be learned earlier than others but also how learners' L1 lexical knowledge influences the development of L2 lexicon. This model suggests that L2 learners might need to have as many properties of lexical knowledge as possible to advance to the final developmental stage or to become

closer to native-like in-depth lexical knowledge. In particular, the different developmental order of each property of lexical knowledge might help us gain an understanding of how each lexical property would contribute to the connections between vocabulary and grammar.

2.1.2. Assessment of L2 Vocabulary

This section will deal with what types of testing methods have been invented for L2 vocabulary assessment in order to address the issue of how to measure depth of lexical knowledge. For this, we will first look over how to measure learners' vocabulary size, and then discuss how to estimate how well a given word is known by L2 learners. This discussion will serve as the basis for creating a depth of vocabulary knowledge test for the current study. Thus, much attention will be paid to what type of vocabulary test has been proposed to measure depth of vocabulary knowledge more easily and accurately.

2.1.2.1. Assessment of L2 Vocabulary Size

In general, L2 research into how many words L2 learners should know has been done on the basis of L1 speakers' vocabulary size, since the native speakers' vocabulary size can provide a goal for language learners and inform language teachers of how many words L2 learners need to use their target languages in a native-like way (Read, 2000; Nation, 2001). In addition to the role of vocabulary size as learning goals, native-

speakers' vocabulary size has been used to see how intentional or incidental vocabulary learning influences the growth of vocabulary size (Nation, 2001), which might provide some insight into which method might be more effective to enlarge L2 vocabulary size. Specifically, L1 reading research has shown that native speakers' vocabulary growth might be influenced by incidental learning through context, i.e. reading (Nagy, Herman, & Anderson, 1985, 1987).

There have been two major methods of measuring learners' vocabulary size: the dictionary-based method and the frequency list-based method (Schmitt, 1994; Read, 2000; Nation, 2001). The dictionary-based method has been mainly adopted for the assessment of native speakers' vocabulary size. This method uses vocabulary items systematically selected from a large dictionary, e.g. the fifth word from every tenth page. Total vocabulary size is calculated by multiplying the test score by the number of words in the dictionary. However, as Schmitt (1994) pointed out, this testing method has the following limitations: dictionary sizes used for making this test might be different, sample words used for this test seem to be too small to elicit reliable assessment results, and finally this method is not appropriate for L2 learners.

The frequency list-based method is based on word frequency count lists, which are created from L1 corpus data. The test items are selected from different levels of frequency lists, and total vocabulary size is determined by adding test scores from each level. Thus, information about how many words learners know at each frequency level can be gained from this kind of test (Schmitt, 1994), and Nation's (1990) vocabulary level

test is one example of this kind of vocabulary size test.

2.1.2.2. Assessment of Depth of Vocabulary Knowledge

Despite the importance of depth of lexical knowledge in L2 vocabulary learning, there have been only two studies on how to measure it: Vocabulary Knowledge Scale (VKS) (Wesche & Paribakht, 1996) and Word-Associates Test (Read, 1993, 1998). First, Wesche and Paribakht (1996) invented the Vocabulary Knowledge Scale (VKS) to assess how well L2 learners know a given target word. This test consists of self-report scales and production tests. The self-report scales range from complete unfamiliarity with a given word to perfect use of it with respect to grammatical and semantic accuracy (See Figure 2.4), and production tests are employed to check if learners really know what they report they know.

Figure 2.4: VKS elicitation scale: self-report categories (Wesche & Paribakht, 1996, p. 37)

I.	**I don't remember having seen this word before.**
II.	**I have seen this word before, but I don't know what it means.**
III.	**I have seen this word before, and I think it means_____. (synonym or translation)**
IV.	**I know this word. It means_____. (synonym or translation)**
V.	**I can use this word in a sentence:_____. (If you do this section, please also do Section IV.)**

Since this vocabulary test places more emphasis on what learners know about a word

than what they do not know about it, it might allow language teachers to assess even their learners' partial knowledge of a given word (Schmitt, 1994). However, Schmitt (1994) pointed out that the number of words covered in this test is small, since relatively lengthy questions are required for one stimulus word. This test might not also be appropriate for measuring receptive knowledge of vocabulary because only the first two questions for a given word (five questions for each word) deal with this receptive knowledge of it (Schmitt, 1994).

The second type of test invented to measure L2 learners' depth of lexical knowledge is the Word-Associates Test (Read, 1993, 1998). This vocabulary test focuses on measuring two important aspects of depth of lexical knowledge: associative and collocational word knowledge of a given word. The format of this vocabulary test is shown in Figure 2.5.

Figure 2.5: The Word-Associate Test (Read, 2000, p.184)

Sudden

beautiful	**quick**	**change**	**doctor**
surprising	**thirsty**	**noise**	**school**

Common

complete	**light**	**boundary**	**circle**
ordinary	**shared**	**name**	**party**

The left side includes adjectives which might be either synonyms of the stimulus word (e.g. *sudden* and *common*) or represent one aspect of its meaning, while the right section has nouns which can collocate with the stimulus word. Thus, *quick* and *surprising* are associated with the word *sudden*, and *change* and *noise* can collocate with it. However, this depth of vocabulary knowledge test also seems to have its shortcomings, in that it contains only adjectives as the stimulus words and the number of words tested throughout this test is not large[18].

Another alternative way of testing depth of lexical knowledge might be derived from Webb's (2005) work on measuring the multiple aspects of lexical knowledge, which was based on the taxonomy of the types of lexical knowledge proposed by Nation (1990, 2001). This test attempted to cover various properties of lexical knowledge from the perspective of receptive vs. productive distinction. Webb (2005, pp. 39-42) designed this test to measure five properties of lexical knowledge such as orthography, meaning and form, grammatical functions, syntax, and association, and the receptive vs. productive distinction was included as another dimension. Thus, the total number of test questions for one target word is 10.

First, for the orthographic property of a target word, its productive knowledge is

[18] Tests for depth of lexical knowledge always have this kind of problem with the number of items covered in the tests. From a practical point of view, it might be impossible to measure learners' vocabulary size and depth of lexical knowledge at the same time. Vocabulary size tests tend to contain a relatively large number of items, and the depth of word knowledge test may have at least more than two questions for each stimulus word. Thus, the number of the test items for assessing both the breadth and depth of lexical knowledge might be too large to be administered in a single session.

tested by using a word dictation test, and its receptive knowledge is assessed by having learners choose correct spellings. Second, the translation from L1 meanings into L2 words and the translation from L2 words into L1 equivalents are used for testing productive and receptive knowledge of meaning and form, respectively. Third, learners' knowledge of grammatical functions is measured by a sentence construction test using a target word (for its productive knowledge) and a multiple choice test in which learners choose one correct sentence from three choices (for its receptive knowledge). Fourth, productive knowledge about the syntactic property of a given word is tested by asking learners to produce an L2 syntagmatic associate, while its receptive knowledge question asks them to choose the responses that can occur with the target word. Finally, productive and receptive knowledge of association are measured in the same way that the syntactic property of a target word is tested: the production of an L2 paradigmatic associate and the selection of the responses that are paradigmatic associates with a target word.

In conclusion, since the current study relies on the multiple properties of lexical knowledge to represent depth of lexical knowledge, Webb's (2005) work on assessing five aspects of lexical knowledge might serve as a basis for designing the depth of lexical knowledge test for this study. On the other hand, the Vocabulary Knowledge Scale (VKS) (Wesche & Paribakht, 1996) tends to pay much attention to the different degrees of semantic knowledge of a stimulus word, and thus more questions should be added to cover other properties of lexical knowledge. The Word-Associates Test (Read, 1993,

1998) uses English adjectives as the stimulus word to measure L2 English learners' knowledge about associated and collocated words of the adjectives. Thus, it might be more appropriate to create a test focusing on semantic, morphological, and syntactic properties of English verbs on the basis of Webb's (2005) work than to revise the two existing tests for depth of lexical knowledge.

2.1.3. Summary and Conclusion

Although vocabulary has been seen as one of the essential components in L2 acquisition, it is also true that vocabulary-related topics have received less attention from L2 researchers than grammar-related issues (Richards, 1976; Zimmermann, 1997). However, this neglected field in L2 research has recently started to become the main focus of many L2 researchers. This section dealing with L2 vocabulary development has been devoted to a few issues about identification and representation of lexical knowledge: productive vs. receptive vocabulary knowledge and use, breadth vs. depth of L2 word knowledge, and developmental stages of the L2 lexicon. In particular, it was suggested that depth of L2 lexical knowledge might be represented by multiple properties of lexical knowledge identified in L2 vocabulary research. It was also pointed out that there might be a similarity between the different degrees of lexical knowledge represented by multiple properties and the developmental order of lexical information assumed in Jiang's (2000) lexical developmental model.

We have also discussed how to measure L2 lexical knowledge to explore some

ways of testing depth of L2 vocabulary knowledge for the current study. For this, this section has overviewed a few previous studies on how to assess learners' vocabulary size and depth of vocabulary knowledge. Among them, Webb's (2005) work on measuring multiple properties of lexical knowledge seems to provide a basis for making a vocabulary test for this study.

Last but not least, most of the issues discussed in this section, if not all, imply that there might be some connections between lexical and grammatical knowledge in the development of L2 acquisition. If L2 lexical knowledge is viewed as containing morphological and syntactic properties as well as semantic, it follows that vocabulary and grammar might exhibit some connections in the course of their acquisition. In other words, since grammatical knowledge generally refers to both morphological and syntactic knowledge, the different degrees of lexical knowledge, which can be represented and assessed by the various lexical properties, are expected to be linked to at least part of grammatical knowledge. In the next section, we will deal with empirical and theoretical evidence showing the interdependency of vocabulary and grammar, based on generative syntactic theory and L2 research into grammatical development.

2.2. L2 Grammatical Knowledge

2.2.1. Different Stages of L2 Grammatical Development

The foci of early L2 research into learners' grammatical development were on the description of acquisition order of grammatical morphemes and the characterization of

developmental stages of a specific syntactic structure. In this section, the previous studies on both acquisition order of L2 English grammatical morphemes and different developmental stages of English grammatical structures will be briefly reviewed to look at how L2 learners acquire their target language with regard to grammatical structures and to find out a certain point in which L2 lexical and grammatical knowledge would be connected.

2.2.1.1. Acquisition Order of Grammatical Morphemes

Early studies on L2 grammatical development were primarily concerned with morpheme acquisition order by L2 learners. Dulay and Burt's (1973) influential study on the acquisition accuracy or order of English grammatical morphemes by child learners showed that there is the relative difficulty of some morphemes over others. For instance, it was observed that the most accurate morphemes were progressive *–ing*, contracted copula *be*, and article *a/an,* while the least accurate morphemes were possessive -*'s* and 3rd person singular *–s.* This study also showed the same accuracy pattern across the subjects with different lengths of exposure or different types of exposure to English.

With regard to L1 influence on the difficulty of L2 grammatical morphemes, Dulay and Burt (1974) found that regardless of subjects' L1 backgrounds, a similar pattern appeared in the accuracy of the acquisition of each L2 English morpheme. Bailey, Madden and Krashen (1974) also studied the acquisition of L2 grammatical

morphemes by adult English learners, and found a similar morpheme acquisition pattern shown in Dulay and Burt's studies. This result from L2 research implies that there are similarities between child and adult English learners in the acquisition of L2 grammatical morphemes. However, despite these consistent results found across relevant studies, these morpheme acquisition studies might be inadequate to draw a generalization about the acquisition order of L2 morphemes. These studies dealt with only a limited number of English grammatical morphemes and failed to provide an explanation for why this particular kind of acquisition order was shown in L2 acquisition (Wei, 2000; Gass & Selinker, 2001).

On the other hand, Wei's (2000) suggestion about why and how a particular morpheme is acquired earlier than others seems to provide a lexical-based account of this morpheme acquisition order. Based on a model of morpheme classification proposed by Myers-Scotten and Jake (1999), Wei (2000) mentioned that there are three types of morphemes: content morphemes, early system morphemes, and late system morphemes. In general, content morphemes refer to content words such as nouns and verbs, and system morphemes are function words such as determiners, auxiliary verbs, and inflectional morphemes. Again, system morphemes can be divided into early morphemes (e.g. progressive *-ing*, past participle *–ed*, and definite article *the*) and late morphemes (e.g. past tense *–ed*, 3rd person *-s*, and copula *–be*), according to whether the morphemes are necessary for adding a semantic meaning or satisfying a grammatical requirement.

For instance, progressive *-ing* indicates that an event expressed by a given verb is in progress, while 3rd person *–s* is required by English grammar without conveying any additional meaning. According to this classification, Wei (2000) claimed that 'semantically or conceptually salient' morphemes might be first activated in the course of L2 acquisition. That is, morphemes which make a semantic contribution might be acquired earlier than morphemes which do not add a semantic meaning[19]. This prediction appears to be consistent with the findings from previous morpheme acquisition order studies, in that progressive *–ing* is acquired earlier than 3rd person *–s*.

In conclusion, Wei's (2000) semantic-based explanation of morpheme acquisition order seems to imply that there might be some connections between lexical and grammatical knowledge in the acquisition of L2 English grammatical morphemes, since this account is based on the fact that the English morphemes have both semantic and grammatical properties. Thus, it is expected that the grammatical knowledge related to the semantically-salient morpheme like *-ing* might be acquired earlier than the grammatical property of 3rd person singular morpheme *–s*, which does not have a semantically-salient meaning.

2.2.1.2. Acquisition of Grammatical Structures

The acquisition of L2 grammatical structures has been investigated primarily

[19] For more detailed discussion about how the differences in 'semantic or conceptual salience' might be linked to the acquisition order, see Wei (2000, pp. 114-119).

through looking at the syntactic characteristics which determine the different stages of L2 acquisition of a specific grammatical structure, rather than by focusing on the lexical properties that characterize each developmental stage. Thus, research into L2 grammatical acquisition has been devoted to describing syntactic features shown in each developmental stage of specific grammatical structures such as negation, interrogative, word order, and embedded clause (Felix, 1977; Cancino, Rosansky and Schumann, 1978; Braidi, 1999; Hawkins, 2001). However, if we admit that any grammatical structures are, in fact, overtly realized by specific lexical items, it follows that the development of grammatical structures might also be associated with the acquisition of lexical items.

Thus, with respect to the acquisition of English *wh*-questions, L2 learners need to acquire English interrogative pronouns such as *what*, *how*, *when*, or *where,* along with the acquisition of other related syntactic features such as *do*-support and subject-verb inversion (Butterworth & Hatch, 1978; Ellis, 1984, cited in Braidi, 1999). Braidi (1999) mentioned that L2 English question formation tends to show the following general developmental stages: (1) intonation question, (2) *wh*-questions with copular, (3) non-inverted yes/no and *wh*-questions with all verb types, (4) inversion with copula, aux, and main verb in yes/no questions and *wh*-questions, (5) do-support with main verbs in *wh*-questions, and (6) do-support with main verbs in yes/no questions. These developmental stages clearly show that L2 learners need to acquire relevant lexical items like *wh*-words in order to advance to the *wh*-question stage.

The L2 development of English negation also suggests the significant role of

negative words like *no* or *not* in the acquisition of negation structures.

Table 2.1: Developmental Stages of L2 English Negation (Cancino et al., 1978, p. 229, cited in Braidi, 1999):

(a) *no* Verb	I *no* understand
(b) *don't* Verb	He *don't* like it (unanalyzed don't)
(c) *auxiliary – negation*	You *can't* tell her
(d) analyzed *don't*	He *doesn't* spin

Table 2.1 shows that at the initial stage, L2 English learners tend to use only *no* when they make negative sentences as in 'I *no* understand'. However, with the acquisition of *not*, they start to make a negative sentence like 'He *don't* like it', even though they still use *don't* as one word. As they advance to the next steps, they start to use *auxiliary - negation* and analyzed *don't*. The development of L2 English negation also indicates that the acquisition of negative words might be linked to the formation of negative sentences.

Thus, the acquisition of some syntactic structures, if not all, might be closely linked to the acquisition of specific lexical items. Furthermore, it seems that this claim about connections between lexical and grammatical knowledge might receive theoretical support from generative syntactic theory proposed by Chomsky (1957, 1965, 1981, 1986, 1995). Since its inception this syntactic theory has evolved 'in the direction of representing more and more grammar as lexically governed (Singleton, 1999, p. 18)'. Thus, this generative syntactic theory might be one possible candidate which will

provide an adequate account of L2 grammatical knowledge in general and the interdependent nature of lexical and grammatical knowledge in particular. The next section will deal with how the interdependent nature of lexical and grammatical knowledge in L2 acquisition has been reflected in the theoretical framework of generative syntax.

2.2.2. A Generative Approach to L2 Syntactic Development

2.2.2.1. An Overview of Generative Syntax

Before starting to discuss the issue of L2 syntactic development within a generative framework, the general ideas about generative syntax and the theoretical evolution of this approach will be presented. Since 'Generative Syntactic Theory' was first put forward by Chomsky (1957), the basic ideas about language and language acquisition have remained mostly unchanged throughout its subsequent theoretical development. However, the description of syntax, or the conceptualization of the generative procedures for syntax have been radically modified or revised (Huen, 2002; Cook & Newson, 2007). This generative approach to syntax was originally initiated as a criticism of limitations that the contemporary behaviorist or structuralist view of language or language acquisition had held. The behaviorist or structuralist position about language could not explain two distinctive characteristics of language such as the creative aspect of language use and the speedy and effortless language acquisition process (Herschensohn, 2000; Chomsky, 2002; Saville-Troike, 2006; Brown, 2007). That

is, not only a surface structure-based analysis of language but also language learning as habit-formation through imitation might be inadequate to capture the fact that "normal linguistic capacities range over unbounded domains: every speaker can produce and understand an unbounded number of linguistic expressions in normal language use" (Chomsky, 2002, p.2).

These theoretical limitations of the structural and behaviorist perspectives led Chomsky and his followers to propose that "innate knowledge that the human species is genetically endowed with" (Saville-Troike, 2006, p. 47) should exist in the 'language faculty'. This innate knowledge about language will account for how an infinite number of novel linguistic expressions can be produced and understood and what makes it possible for every child to complete his/her L1 acquisition so early in life without any conscious effort, despite a relatively insufficient language input [20]. In other words, in order to address the following questions about language– (1) what is knowledge of language? and (2) how is it acquired?, this generative approach has suggested that humans might be born with innate knowledge about what all human languages have in common, which is referred to as Universal Grammar (Chomsky, 1965, 1981). Thus, the notion of UG has played a significant role in the description of language knowledge and the explanation of language acquisition process.

[20] This problem is also known as the "poverty of stimulus" or the "logical problem of language acquisition" (Cook & Newson, 1996, 2007; White, 2003a, 2003b). This issue will be dealt with in the next section.

In general, this UG-based syntactic theory has been developed through the three phases in terms of the conceptualization of Universal Grammar or generative procedures: the rule-based phase, the principles and parameters phase, and the minimalist phases (Herschensohn, 2002; Chomsky, 2002; Huen, 2002; Cook & Newson, 2007). First, in his initial work, Chomsky (1957) claimed that language consists of a finite set of phrase structure (PS) rules which 'generate' the basic sentence structures and a limited number of transformational rules that alter the basic structures derived from the PS rules into various types of sentences like passives, imperatives, and questions. Thus, the limited number of PS rules such as S → NP + VP, VP → V + NP, and NP → Det + N, and transformational rules like *passivization* account for the production of an infinite number of novel linguistic expressions[21]. For instance, a *passivization* transformation was claimed to derive the passive sentence such as *You are loved by me* from an active sentence *I love you*[22].

In this rule-based generative syntactic model, the role of Universal Grammar was assumed to provide "the general format which specific rule systems are required to adhere to, as well as general constraints on rule application" (Chomsky,,2002, p.12). Thus, L1 acquisition was understood as eliciting language-particular rules from given language input on the basis of the general format defined by UG and as establishing a

[21] The application of these rules occurs recursively in order to generate expanded sentence structures, as pointed out in Chomsky (2002, p. 3), "the critical formal contribution of early generative grammar was to show that the regularity and unboundedness of natural language syntax were expressible by precise grammatical models endowed with **recursive procedures**".
[22] This derivation will be discussed in more detail in the section 2.2.2.3.

"rich and intricate system of rules" (Chomsky, 1995, p. 170). However, this early generative approach to syntax seems to have some theoretical limitations with respect to the explanatory aspect of language theory. Transformational rules are structure-specific and language-specific, in that a passivization rule for English is formulated differently from that for German. This language-specific approach fails to capture the fact that many other languages also have passive structures similar to English passivization, even though the specific rule formations are cross-linguistically different (Herschensohn, 2000, p. 59).

The second phase of the generative approach shows radical changes into a Principles and Parameters approach (also known as Government and Binding theory) (Chomsky, 1981, 1986). This Principles and Parameters approach claimed that language grammar is not represented as a language-specific rule system, but is accounted for by principles universal to all languages and parameters whose values are different from language to language (Chomsky, 2002, p. 14; Cook & Newson, 2007, p.9). The role of UG in this framework provides principles that are cross-linguistically identical, and some of these principles contain parameters of which value can be set in limited ways (Chomsky, 1995, 2002). As pointed out by Chomsky (2002), the major theoretical contribution of this principles-based approach was to provide a new perspective of dealing with language acquisition. Specifically, the logical problem of language acquisition could be handled by reducing the major task of language acquisition to parameter setting based on given L1 input.

Lastly, since the early 1980s, Chomsky and his followers have tried to establish a simpler grammar model by discovering "more and more powerful principles for language knowledge" (Cook & Newson, 2007, p. 9) and by eliminating redundant components or principles from the grammar model. This quest motivated them to change their early rule-based approach into a principle-based grammar system, ultimately leading to the Minimalist Program (Chomsky, 1995), which is the latest model of generative syntax. As implied by its name, this recent model has tried to minimize a grammar system by getting rid of some superfluous components and by making the linguistic representation and derivation as economic as possible.

This recent syntactic model claims that invariant linguistic principles such as *move*, *merge*, or *principle of economy*[23] might determine possible syntactic derivations (Chomsky, 1995; Cook & Newson, 1996, 2007), and that cross-linguistic syntactic variations (e.g. word order) can be attributed to idiosyncrasies in a particular language's lexicon which is presumed to be a provider of the morphological and syntactic information of each lexical item (Chomsky, 1995; Cook & Newson, 1996; Herschensohn, 2000). Thus, the parameter value, which was assumed to determine cross-linguistic syntactic variations

[23] This UG principle claims that 'syntactic representations should contain as few constituents and syntactic derivations involve as few grammatical operations as possible' (Radford, 2004, p. 449). In other words, this principle, in fact, points out that 'languages always seem to use the minimal number of steps or processes to form a given structure that UG will allow' (Cook & Newson, 1996, p. 169).

in the previous P & P model, is also claimed to be stored in the lexicon[24] (Cook, 1996; Cook & Newson, 2007). Consequently, this important role of the lexicon that is assumed in the MP framework might provide a theoretical background of the current study. Specifically, the claim that the idiosyncrasies of the lexicon might determine cross-linguistic syntactic variations suggests that lexical knowledge of a particular language might also be connected to the acquisition of syntactic structures of the particular language.

So far we have looked briefly at how the generative ideas have been theoretically realized and developed over the last four decades, and how the issues about language knowledge and language acquisition have been addressed from this generative perspective. The important point drawn from its theoretical development might be that language grammar might consist of UG principles and language-particular lexicon. Thus, UG is concerned with something that all human languages have in common, and the lexicon might include language-particular knowledge which cannot be covered by universal principles (Chomsky, 1995; Cook & Newson, 1996). The next two sections will deal with the role of UG and the lexicon in L2 acquisition, respectively.

2.2.2.2 Universal Grammar and L2 Acquisition

Universal Grammar (UG) refers to a grammar which is genetically endowed to

[24] This claim is known as 'lexical parameterization hypothesis' (Borer, 1984, from personal communication with Dr. Julia Herschensohn)

all human beings and which all languages have in common (White, 2003a, 2003b). The idea of the innate universal language properties has been proposed as an explanation of what makes it possible for children to acquire their native language with limited data available to them (White, 2003a, 2003b). That is, the role of UG in L1 acquisition is motivated by the poverty of the stimulus or the logical problem of language acquisition (Chomsky, 1965, 1986). As stated in White (2003a), "there is a mismatch between …. the utterance a child is exposed to and the abstract and complex knowledge [of language] that the child acquires" (p. 20). UG serves to fill this gap between language input and output by providing a basic device which allows us to acquire our native language despite insufficient language stimulus.

Importantly, UG is a particular theory about the initial state of the language faculty (Chomsky, 1986, 1995). The initial state has a function of mapping linguistic data to a language, and UG specifies a possible language by determining what counts as possible linguistic derivation and a possible derived linguistic expression. Thus, UG makes it possible for children to start to acquire their L1 through only limited number of possible grammar formation (White, 2003a, 203b).

L2 learners are also confronted with a similar logical problem to that of L1 acquirer, in that there are abstract, subtle, and complex properties of grammar that are underdetermined by L2 input (Cook, 1994; Cook & Newson, 1996; White, 1989, 2003a). Thus, if it turns out that L2 learners acquire abstract and subtle linguistic knowledge that could not have been induced from one of the following sources: L2 input, general

learning processes, L1 grammar of learners, and explicit instruction about this abstract knowledge (White, 2003a, p.23), this is a strong indication that UG constrains their L2 mental grammar (White, 1989, 2003a), or that UG is accessible even to L2 learners. Consequently, this role of UG in L2 acquisition has been closely tied to the issue of whether or not adult L2 learners can also have access to UG as assumed in L1 acquisition. This UG accessibility issue in generative-based L2 research has played a central role in addressing the nature of the linguistic knowledge with which learners begin their L2 learning, since UG is concerned with the initial state of language acquisition (Cook & Newson, 1996, 2007; Saville-Troike, 2006; White, 003b).

However, there might be some weaknesses in this UG-accessibility research. First, it is the case that the UG accessibility issue still remains controversial, in that many empirical studies have failed to show consistent results supporting UG availability in L2 acquisition (Saville-Troike, 2006). Second, since UG is claimed to be a theory about the initial state of language acquisition (Chomsky, 1986, 1995), there might be some problems explaining the final stage in L2 acquisition, which might be characterized as variability and incompleteness. Since it is true that unlike L1 acquirers, almost every L2 learner fails to achieve native-like competence (Cook & Newson, 2007; Saville-Troike, 2006), there should be additional factors affecting the L2 final state. That is, even if L2 learners can have access to UG, the fact that there exist variability and incompleteness in the ultimate state of L2 acquisition leads us to think that other factors might probably be involved in the course of L2 acquisition. In this regard, Saville-Troike (2006, p. 52) put

forward many possible factors which might influence the L2 final state or the UG accessibility: individual differences in the degrees of UG accessibility, different L1 effects, qualitatively different L2 input, different abilities to perceive mismatches between L2 input and existing L1 parameter values, and different degrees of lexical specification in L2 learners' lexicon.

Among them, the fact that different degrees of lexical knowledge are proposed as one possible source to bring about variability and incompleteness in the L2 final state seems to reflect the important role of lexical knowledge in the L2 development. Therefore, even though UG is available in L2 initial state, the incomplete or gradual mastery of L2 lexicon is expected to have some influence on the ultimate attainment of L2 learners with respect to L2 grammatical development. This expectation, in turn, might lead us to infer that there might be connections between lexical and grammatical knowledge in L2 acquisition. Thus, UG accessibility issue might not play a crucial part in the explanation of L2 learner language anymore, but rather the L2 lexicon should be the main concern in L2 acquisition. The next section will discuss the role of the lexicon in UG theory in general and syntactic construction in particular by examining how the role of lexicon has been developed in this generative approach.

2.2.2.3. Lexicon and Syntactic Structures

The important role of the lexicon in generative syntactic theory has frequently been noted in relevant research (Cook, 1994, 1996, 2007; Herschensohn, 2000; Saville-

Troike, 2006; Singleton, 1999, 2000; Towell, 2003). Singleton (1999, 2000) claimed that generative syntactic theory has consistently been developed "in the direction of representing more and more grammar as lexically governed" (Singleton, 1999, p.18), in that many linguistic phenomena which had been represented syntactically in the earliest model were given a lexical-based account. Singleton (2000) presented English *passivization* as one of the examples which shows how this theoretical evolution from 'syntactic representation independent of the lexicon' to 'syntactic representation dependent of the lexicon' took place.

Within the earliest generative model, English *passivization* as a specific construction of a specific language was syntactically represented by the structure-particular rule. When we produce a passive sentence like *You are loved by me*, its derivation should start with the corresponding active sentence like *I love you* which is generated by phrase structure rules[25]. Subsequently, the passive structure rule is applied to this active structure to derive the passive structure as demonstrated below:

Figure 2.6: English passivization in the earliest generative model (Singleton, 2000)

NP1 + V + NP2 (Active Sentence) → NP2 + *be* + V*en* + *by* + NP1(Passive Sentence)
I love you → ***You are loved by me***

This passivization rule is applied independently of lexical characteristics of individual

[25] The following phrase rules are used to generate the sentence 'I love you': Sentence (S) → Noun Phrase(NP) + Verb Phrase(VP) and Verb Phrase (VP) → Verb(V) + Noun Phrase (NP).

words. That is, the application of transformational rules was purely a syntactic operation without relying on lexical knowledge. However, this syntactic-based rule application might fail to derive an acceptable passive sentence like *John was taken advantage of,* since this passivization rule allows only the direct object of an active sentence to become the subject of the passive sentence. Thus, this rule cannot explain the derivation of the passive sentence *John was taken advantage of*, since *John* is not the direct object of the active sentence *They took advantage of John*. On the other hand, this transformation rule can prevent the unacceptable sentence **John was taken a picture of by them* from being produced, since *John* is not the direct object of the active sentence *They took a picture of John.*

One possible way to explain this different rule application is to assume that the applicability of the passivization rule might be determined by individual words or idiomatic expressions. Thus, if we posit that the object of preposition *of* in *take advantage of* can be used as the subject of the passive sentence as in *John was taken advantage of*, while the object of preposition *of* in *take a picture of* cannot become the subject of the passive sentence, the different applicability of the passivization might be accounted for (Singleton, 2000, p.25). Consequently, the construction of some syntactic structures might be determined by idiosyncratic characteristics of each lexical item or idiomatic expression, suggesting that lexical knowledge might be related to the development of L2 grammatical knowledge.

In fact, this tendency towards emphasizing the role of lexical knowledge in

syntactic construction was embodied in one principle called the 'Projection Principle', which was proposed in the Principles and Parameters model (Chomsky, 1981; Cook & Newson, 1996, 2007; Singleton, 1999, 2000). The Projection Principle is defined as 'lexical information is syntactically represented' (Haegemann, 1991, p.47). This principle holds that "the properties of lexical entries project on the syntax of the sentence" (Cook & Newson, 1996, p.19). Thus, lexical items as the ultimate constituents of a sentence structure are not to be separated from the sentence structure, but rather they should serve as driving forces to shape a sentence structure. The Projection Principle seems to imply that there are some connections between lexical knowledge and syntactic structures, in that the lexical specifications of the word determine which types of structures the word has (Cook & Newson, 1996). The notion of argument structures incorporated in the generative syntax model might show how lexical properties of a given word can be projected on syntactic representation (Haegemann, 1991; Ouhalla, 1994).

The argument structure, which is semantically-determined, can provide specific information on which element(s) a given word is necessarily used with, i.e. the minimally required arguments (Haegeman, 1991). In the case of a verb, particularly, its argument structure is thought to have a crucial influence on what the basic structure of a sentence including the verb would look like (Haegemann, 1991). For instance, the verb *love* requires two arguments as in ***I*** *love* ***Jaeyoon***, while the verb *smile* needs one argument as shown in ***Hailey*** *smiled*. Therefore, the basic sentence structure of *I love*

Jaeyoon is considered to be constructed by lexical information about arguments the verb *love* requires. The distinction between internal and external arguments informs us of which argument is assigned to a subject position or an object position (Ouhalla, 1994). Thus, the internal and external arguments of a verb correspond to the subject and object of the sentence having the verb, respectively. In a sentence like *I love Jaeyoon*, the subject *I* is the external argument of the verb *love*, and the object *Jaeyoon* is considered its internal argument. In generative syntax, the following notation is used to distinguish between internal and external arguments (Ouhalla, 1994).

Figure 2.7: Notation of Internal and External Arguments (Ouhalla, 1994, p.136)

put: agent <theme, location>
hit: agent <theme>
run: agent < Ø >

The terms like *agent*, *theme*, and *location* also known as *theta-roles* refer to the semantic relationships with the verb. Thus, the *agent* role refers to "the one who intentionally initiates the action expressed by the verb or predicate" and the *theme* role means "the person or thing moved by the action expressed by the verb or predicate" (Haegemann, 1991, p.41). The arguments inside the angled bracket represent the internal arguments (e.g. *theme* and *location*), and the external arguments are represented outside the bracket (e.g. *agent*). The symbol Ø shows that there is no internal argument when the verb *run* has the meaning of *move quickly with legs.* That is, the presence or absence of the

internal argument indicates whether a given verb is an intransitive or transitive verb. Consequently, this information about the internal and external arguments are assumed to be specified as lexical knowledge of verbs, and thus this lexical specification might ensure that the subject and object of a verb are syntactically realized in a sentence using the verb.

Another type of lexical information related to the construction of syntactic structures is the 'subcategorization' of lexical items. Thus, lexical knowledge about the 'subcategorization' of a verb includes the number of complements (or objects) and their categories. For example, verbs like *love* and *smile* can have the following frames: [___ NP] (e.g. *Jaeyoon loves me*) and [___] (e.g. *Hailey smiled*), respectively. This information about the subcategorization of two lexical items (*love* and *smile*) shows that intransitive verbs like *smile* do not have any complement, while transitive verbs like *love* have one NP complement. Additionally, since the verbs like *want* or *believe* can have more than one type of complement, the subcategorization information is represented like this: [____ NP / *to*-do] and [____ NP/*that*-clause] in order to specify what types of complements a given verb can take. Although this subcategorization has a similar function to the argument structures, there are some differences between them. The 'subcategorization' covers only the object of a verb such as the number of required objects and the types of them. In particular, since the argument structures do not tell anything about the types of objects (NP, *to*-do, or *that*-clause), this subcategorization information provides a complementary account of the sentence structures, and should

be specified as idiosyncratic lexical knowledge of each word.

In addition, the phrase structure rules might not be needed anymore, in that the lexicon, more specifically lexical information about subcategorization or argument structures actually presents information on what is required to make the basic sentence structure – whether an object should occur or not, which category of an object should be used, or how many/what kinds of arguments should be used for a given predicate or verb. Cook and Newson (1996) noted the relationships between lexical knowledge and syntactic structures in this generative approach in their discussion about the increased importance of the lexicon:

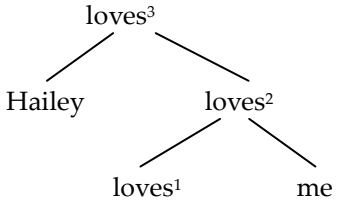
> The lexicon is not … a list of words and meanings; it plays a dynamic and necessary part in syntax. The knowledge of how the verb *like* behaves is inseparable from the knowledge of syntax. Consequently many aspects of language that earlier models dealt with as 'syntax' are now handled as idiosyncrasies of lexical items; the syntax itself is considerably simplified by the omission of many rules, at the cost of greatly increased lexical information (p. 19).

As pointed out by Singleton (1999, 2000), this close association between lexical knowledge and syntactic structures 'reached its logical conclusion' in the most recent version of generative grammar called the Minimalist Program (Chomsky, 1995). In this recent model, it is claimed that the whole process of forming syntactic structures should begin with the selection of lexical items from the lexicon. Thus, the structure of a sentence starts to be built from one lexical item through one universal syntactic

operation called 'Merge'[26]. For example, to derive a sentence like *Hailey loves me*, three words – *Hailey*, *loves*, *me* – are first selected from the lexicon, and then among the selected words, the verb *loves* is first combined with *me*, which is the complement of the verb *loves*, to form the verb phrase *loves me*, and the verb phrase again is merged with *Hailey* to construct the whole sentence *Hailey loves me*. Adger (2003) added that the subcategorization as lexical knowledge of a word can be adopted to "determine the categories of the elements which will merge with that lexical item"' (p.84). Thus, the verb *loves* has a 'categorial selectional feature N(oun)', which means that the verb *loves* must merge with something with an N-feature, i.e. noun, as shown in *loves me*.

In this Minimalist Program, the construction of syntactic structures is claimed to start off by joining together one lexical item and its complement, and then applying this Merge operation - combining one new lexical item and the larger structure produced by

[26] This operation 'Merge' is defined as 'an operation by which two constituents (*loves*^{1} and *me*) are combined together to form a single larger constituent (*loves*^{2}*)'* (Radford, 2004, p. 462). It should also be noted that this process is applied in a recursive fashion, thus the larger constituents formed by combining the first two elements again will be merged with another constituent (*Hailey*) to form another larger constituent (*loves*^{3}) as illustrated below (Cook & Newson, 2007);



the previous step – recursively until a whole sentence is completed[27]. This sentence construction procedure in the Minimalist approach clearly shows the necessity of lexical knowledge in forming sentence structures. That is, when we produce a sentence like *Hailey loves me*, we need to have lexical knowledge about the category of each item (Noun-*Hailey*, Verb-*loves*, and Noun-*me*), the internal and external arguments of the verb *love (*agent <patient>), and the type of internal argument ([___ NP]). Consequently, from this kind of lexical-based syntactic construction, it follows that there are to some extent connections between lexical and grammatical knowledge in language acquisition. However, since this discussion about the role of the lexicon has been primarily based on L1 research, we still need to examine how this lexical-based account of syntactic construction might be understood in relation to L2 acquisition. In the next section, we will address the issue of how this generative approach, which has evolved in the direction of representing syntax as lexically determined, accounts for L2 syntactic acquisition, primarily based on the Minimalist Program.

2.2.2.4. A Minimalist Interpretation of L2 Syntactic Acquisition

Generative-based L2 researchers also pointed out that this syntactic theory has attempted to simplify syntax by abandoning language-specific syntactic rules and handing many aspects of language that earlier models regarded as syntactic over to the

[27] In fact, it should be noted that the whole procedure proposed in Chomsky's original work (1995) is more complicated than presented here. For more detailed discussion, see Radford (2004) and Cook & Newson (2007).

lexicon (Cook & Newson, 1996; Herschensohn, 2000). Thus, this reduction of syntactic parts in UG theory resulted in the view of an increased role of lexical knowledge in syntactic construction. This simplification of syntax implies that the major task of L2 acquisition should be vocabulary learning - the acquisition of lexical items and their properties such as pronunciation, meaning, morphological features, and syntactic features, while the syntactic component determined by universal principles accounts for the core grammar of each language (Cook & Newson, 2007).

This significant role of the lexicon in syntactic construction leads us to ask questions about how the role of lexical knowledge in generative syntax would be interpreted in relation to L2 grammatical development. This link between lexical and grammatical knowledge 'reached its logical conclusion' in the most recent model of generative syntax called the Minimalist Program by maximizing the role of the lexicon[28] and minimizing syntactic operations (Singleton, 2000). Based on the Minimalist Program, Herschensohn (2000) argued that the fundamental difference between L1 and L2 acquisition might not lie in the accessibility of UG principles, but rather the two main post-critical period effects like the loss of spontaneity of acquisition and incomplete

[28] Chomsky (1995) defined the notion of the lexicon in the Minimalist Program as ' a list of "exceptions"'(p.235). He also mentioned that "*the lexicon in the minimalist program is understood in the same way as in earlier work -- essentially, what Bloomfield called "the list of exceptions"; that is, what one cannot know about a minimal atom of computation (a lexical item) from general principles of language or rules of the particular language. That includes features of all kinds. Not written forms, however. They belong to a different system, not the I-language*" (from personal communication with Dr. Noam Chomsky)

control of the L2 morpholexicon. That is, she claimed that there are two aspects of UG, i.e. UG as the form and UG as the strategy, and that the form refers to the set of universal principles and constraints, while the strategy is related to the means by which the child is guided in the course of L1 acquisition. From this perspective, she argued that the two aspects of UG might operate in L1 acquisition, while only the form of UG might be available in L2 acquisition. In other words, universal principles (the form of UG) such as *move, merge,* or *economy of derivation* are predicted to be available to L2 learners, while it is expected that the acquisition of the L2 lexicon (the strategy of UG) might not be UG-driven beyond the critical period. Thus, UG principles are available in both L1 and L2 acquisition, and thus the accessibility of UG principles does not tell us anything about the differences between L1 and L2 acquisition.

Herschensohn (2000) also argued that the incompleteness typical of L2 acquisition might be explained more appropriately within the Minimalist model. This model implies that although cross-linguistically identical aspects of syntax which are incorporated into all languages do not need to be learned[29], the idiosyncratic lexicon of each language needs to be learned, regardless of whether it is related to L1 or L2 acquisition. Thus, in the case of L1 acquisition, the idiosyncratic lexicon might be constructed via UG as the strategy without any conscious effort, while L2 lexicon should

[29] Here, the claim that 'cross-linguistically identical aspects of syntax might be innate in all human languages' is consistent with the claim that UG (Universal Grammar) is fully accessible even in L2 learning (Schwarz and Sprouse, 1994, 1996; White, 2003b)

be acquired without the help of UG as the strategy. This means that the building of the L2 lexicon might require a relatively large amount of time and efforts. Therefore, within the Minimalist framework, major characteristics of L2 acquisition such as a gradual increase in L2 linguistic competence and incomplete L2 mastery might be directly related to this gradual and incomplete building of the L2 lexicon. In other words, since L2 vocabulary learning is not driven by UG at least after puberty, it is almost impossible for L2 learners to establish native-like mental L2 lexicon. This might provide a linguistic-based account of why almost every L2 learner fails to attain native-like linguistic competence (Cook & Newson, 2007; Herschensohn, 2000; Kang, 2002, 2004).

Cook (1998) also pointed out that, given this Minimalist perspective, a crucial part of language learning should be the acquisition of vocabulary, adding that vocabulary learning should include not only word meaning but also the syntactic restrictions that control how to build phrases or sentences. That is, the Minimalist Program implies that L2 acquisition might be seen as a matter of the gradual building of the lexicon and that syntactic development might be directly associated with lexical development (Cook, 1996). Herschensohn (2000) also claimed that "acquisition of L2 syntax should be possible only through acquisition of the L2 morpholexicon[30]" (p. 80).

[30] She mentioned that she "used the term *morpholexicon* to capture, on the one hand the idea that one must acquire the lexicon (including all the peripheral syntactic-semantic-phonological-morphological information associated with each lexical item), and on the other hand that the morphology (and linked syntax) emerges from the lexical learning" (From personal

Consequently, by emphasizing the connections between lexical and syntactic developments, the Minimalist Program makes it possible to capture not only variability in interlanguage grammar, but also the possibility to construct native-like L2 grammar through complete mastery of L2 lexicon.

Finally, when it comes to applying this Minimalist notion to L2 teaching, it can be suggested that L2 vocabulary learning might be an integral part of L2 acquisition or L2 syntactic acquisition. Because this recent syntax model minimizes the role of syntactic components and maximizes the role of the lexicon, the applicability of the Minimalist Program to L2 teaching should be focused mainly on the acquisition of L2 vocabulary knowledge[31]. Specifically, as pointed out in Cook's (1994) pioneering work on UG and L2 teaching, "L2 learners need to spend comparatively little effort on core grammatical structure covered by UG principles"[32], while "they need to acquire an immense amount of detail about how individual words are used in grammatical structures" (p. 43). This, in turn, indicates that vocabulary teaching should not focus on just what L2 words mean but also how the words behave in sentences. Therefore, generative syntactic theory

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communication with Dr Julia Herschensohn).

[31] Regarding this issue, Herschensohn (2000) claimed that "acquisition of the morpholexicon constitutes the major task of the L2ers "(p. 215)

[32] He also added that "UG is concerned with core areas of language knowledge expressed as principles and parameters, not with numerous areas of syntax or grammar that teachers have to deal with everyday…. UG is concerned by definition with 'obvious' things about language. They are not mentioned in typical grammar books for a particular language, because it can be taken for granted that all readers know them" (p.42).

including the Minimalist Program seems to value a syntactic view on L2 vocabulary knowledge, rather than a traditional meaning-based perspective on it. This claim might be consistent with the fact that the lexical knowledge contains morphological and syntactic knowledge about derivation/inflection and argument structure/collocation (Nation, 1990, 2001; Bogaards, 2000).

2.2.3. Summary and Conclusion

Although early studies on L2 syntactic development made considerable contributions to discovering L2 morpheme acquisition order and developmental stages of L2 syntactic structures, this research was limited to descriptive analyses of linguistic data elicited from L2 learners. Thus, generative or UG theory initiated by Chomsky (1957, 1965, 1981, 1986, 1995) was introduced as one way of explaining learners' grammatical knowledge. Since this syntactic theory has been developed in the direction of emphasizing the role of lexical knowledge in constructing syntactic structures, the acquisition of lexical knowledge might be closely related to syntactic development in both L1 and L2 acquisition (Cook, 1996; Herschensohn, 2000).

In this regard, the most recent Minimalist model (Chomsky, 1995), which maximizes the role of the lexicon and minimizes syntactic components, might provide a new way of viewing the relationships between lexical and grammatical knowledge in L2 acquisition. In particular, this minimalist approach might be appropriate for accounting for variability and incompleteness typical of L2 acquisition, since incomplete

mastery of L2 vocabulary is expected to be directly associated with incompleteness in L2 grammatical development.

In the next section, we will discuss in more detail the interdependent nature of lexical and grammatical knowledge in L2 acquisition, based on not only relevant theoretical considerations presented so far, but also on some empirical studies on the relationships between lexical knowledge and proficiency development.

2.3. Relationships between Lexical and Grammatical knowledge

The previous two parts of this chapter have focused on depth of vocabulary knowledge and the role of lexical knowledge in generative syntax to raise questions about the relationships between vocabulary learning and grammatical knowledge. In an effort to identify various properties of lexical knowledge that L2 learners need, many L2 researchers pointed out that morphological and syntactic information should be included in L2 vocabulary knowledge, along with word meanings (Gass, 1999; Celce-Murcia & Larsen-Freeman, 1999; Bogaards, 2000; Nation, 2001). On the other hand, some generative-based L2 researchers (Cook, 1994; 1996, Cook & Newson, 1996; Hershensohn, 2000) suggested that a large part of L2 syntactic acquisition might be determined by L2 vocabulary learning, since, in generative syntactic theory, lexical information about the syntactic and morphological properties of words has been considered to play a crucial role in forming the structure of a sentence. Specifically, the syntactic property of a word is represented by the argument structures or

subcategorization of the word (Haegemann, 1991).

Thus, to understand the interdependent nature of lexical and grammatical knowledge in L2 acquisition, we need to take into consideration morphological and syntactic properties of L2 lexical knowledge and the role of lexical information in L2 grammar construction. That is, we need to see how a sentence can be built up from the morphological and syntactic properties of lexical items to better understand why vocabulary and grammar develop interdependently. In this regard, the following sections will examine how various properties of lexical items would be linked to the acquisition of overall L2 grammatical knowledge.

2.3.1. Morphological and Syntactic Aspects of Lexical Knowledge vs. Grammatical Knowledge

As stated repeatedly throughout this chapter, many L2 vocabulary researchers have proposed that lexical knowledge should be understood as having many different properties such as meaning, spelling, pronunciation, morphological/syntactic features, and discoursal features as well as meaning, spelling and pronunciation. Among them, two properties of lexical knowledge, morphological and syntactic knowledge, can be singled out as being directly linked to L2 learners' overall grammatical knowledge.

First, the morphological property of L2 word knowledge refers to information about how a given word is morphologically realized. This type of lexical knowledge contains derivational and inflectional knowledge of a given word. Inflectional

knowledge represents grammatical functions of a given word within a sentence. For instance, when the inflectional morpheme *–ed* is attached to a given verb, it makes the verb represent 'past tense'. The 3rd person singular morpheme *–s* also has grammatical information about tense, agreement, and number. Derivational knowledge also seems to be related to grammatical knowledge, since the process of deriving a new word from a stem through the addition of an affix (O'Grady & Dobrovolsky, 1987, p. 134) can change the category (or part of speech) as well as the meaning of the stem, as shown in *predict* (verb) + *ion* → *prediction* (noun), *book*(noun) + *ish* → *bookish*(adjective), and *colony*(noun) + *ize* → *colonize* (verb). More importantly, the word derivation not only changes the category of a stem but also the characteristic of its subcategorization (Ouhalla, 1994, p. 42). Thus, as seen in the following two sentences including related words - *Mary translated the book vs*. *The translation (of the book) was awful,* the presence of complement (*the book*) is obligatory in the case of the verb *translate*, while the noun *translation* can take its complement (*of the book*) optionally. Consequently, the derivational knowledge that individual lexical items have is to some extent related to grammatical knowledge.

On the other hand, the latest model of generative syntax claims that inflectional morphological features which are mainly related to tense and agreement might serve as an important role in accounting for cross-linguistic syntactic variation. For instance, cross-linguistic differences between English and French with respect to adverb position, as in (1) and (2), can be explained by the differences in the strength of the tense feature

of the verbs (*embrasse* vs. *kissed*) between the two languages.

(1) a. *Vous **souvent** *embrassez* Marie.
b. Vous *embrassez* **souvent** Marie

(2) a. *You *kiss* **often** Mary.
b. You **often** *kiss* Mary.

The difference in the adverb position can be redefined in terms of the presence of a weak tense feature in English and a strong tense feature in French. Thus, if we consider that the tense feature of the verb *kiss* is too weak to trigger the overt movement of the verb to the left of the adverb *often*, we can understand why English frequency adverbs always occur before main verbs. On the other hand, since French tense feature is strong enough to cause the verb *embrasse* to move to the left of the adverb *souvent*, the adverb *souvent* appears on the right of the verb. The difference between the two languages with respect to word order might be explained by language-specific morphological features. Thus, this recent generative approach seems to consider morphological features in the lexicon as one of crucial elements determining grammatical structures.

Next, the syntactic property of vocabulary knowledge is concerned with how a given word is syntactically constrained, i.e. how many words are obligatorily used with a given word or what type of complement a given word should take. As mentioned in Bogaards (2000), if L2 learners know a grammar of the target language, then they should also know about which grammatical rules or constraints are applied to individual words.

For instance, if an English learner knows about the differences between a *to*-infinitive and gerund, then they also need to know whether a given verb takes a *to*-infinitive or gerund as its complement, as shown in *He decided to stay at the hotel vs. She had just finished dressing the children*. Thus, L2 learners should have lexical knowledge about how many arguments a given verb takes in a particular meaning or what type of preposition a given verb or adjective takes when it represents a specific meaning so that they can have more accurate grammatical knowledge about their target language. Within the generative framework, this syntactic information of a word has been represented as argument structures or a subcategorization frame (Haegemann, 1991; Ouhalla, 1994; Cook & Newson, 1996). Thus, it was already stated that the argument structures of verbs can tell us about what type of argument is assigned to the subject position of the sentence and what type of argument should be placed in the object position. However, since 'argument structures' are semantically determined, we might not exclude the possibility that the semantic property of lexical knowledge might be at least indirectly associated with syntactic constructions.

Now we need to think about what these morphological and syntactic properties of vocabulary knowledge mean in terms of grammatical knowledge. For the current study, grammar was defined as referring to the morphological and syntactical aspects of language in the traditional sense. Therefore, morphological and syntactic properties of vocabulary knowledge might make contributions to the acquisition of grammatical knowledge, particularly because what it means to know a grammar of a particular

language also indicates that we know how individual words realize the grammar. The past tense morphology of English verbs is realized in various ways: *love – loved*, *go-went*, and *put – put*, and the objects of two English verbs such as *believe* and *love* can be differently realized: *Everyone believed it, I don't believe in miracle*s, and *I believed that she's been to New York vs. I love chocolate*, *I would love to see them again*, and *I love playing the piano*. In conclusion, since a grammar of a particular language, in fact, includes the morphological and syntactic properties of individual words, it is expected that there might be connections between lexical and grammatical knowledge in L2 acquisition.

2.3.2. Relationships between Vocabulary and L2 Proficiency

As mentioned earlier, there has been little research into the relationships between vocabulary and grammar in L2 learning, specifically with respect to depth of lexical knowledge. Instead, L2 research into the relationships between vocabulary and L2 proficiency might offer a glimpse of the interdependency of vocabulary and grammar, since grammar is an essential factor determining learners' proficiency levels. Thus, we will discuss how the relationships between vocabulary and proficiency have been examined, particularly based on two sub-skills of L2 proficiency – reading and writing. To begin with, how vocabulary knowledge would be related to L2 proficiency can be examined in two lines of viewing L2 word knowledge: breadth and depth of L2 word knowledge (Zareva et al., 2005).

First, the relationships between the breadth aspect of vocabulary and L2

proficiency are closely tied to the issue of how many words L2 learners need to know to attain a certain level of L2 proficiency or whether vocabulary size increases as L2 proficiency develops. Adolph and Schmitt (2003) suggested that 2000 word families might be enough to help L2 learners engage in everyday communication, and that 3000 word families would be better if learners want to minimize their lexical gaps. Zareva et al. (2005) also found that vocabulary size is sensitive to L2 proficiency development, meaning that there is a close link between breadth of vocabulary knowledge and L2 proficiency. Second, the depth aspect of vocabulary knowledge in L2 proficiency development is concerned with how the different degrees of lexical knowledge are associated with L2 proficiency level. Zareva et al. (2005) showed that depth of vocabulary knowledge assessed by a word-association test (Read, 1993, 1998) is related to L2 proficiency levels. Thus, the development of L2 proficiency in relation to vocabulary learning should be understood as a function of the enlargement of vocabulary size and the degrees of vocabulary knowledge. In terms of the enlargement of vocabulary size, as L2 learners' proficiency level develops from novice to superior, their vocabulary size will be increased, and L2 learners will need to learn more specialized vocabulary or low-frequency vocabulary. On the other hand, with respect to the degrees of L2 vocabulary knowledge, it is assumed that the higher L2 learners' proficiency level is the deeper their lexical knowledge is.

Next, we will focus on the relationships between depth of vocabulary knowledge and specific language skills, such as reading and writing for more information on how

depth of lexical knowledge will contribute to the enhancement of L2 proficiency. First, when it comes to the relationships between vocabulary knowledge and reading comprehension, Qian (1999, 2002) and Qian & Schedl (2004) showed that there was a high and positive correlation between vocabulary size and reading performance, and depth of lexical knowledge was highly and positively correlated with learners' reading comprehension as well. Qian (1999, 2002) also noted that these results indicate that depth of lexical knowledge can make contributions to the prediction of reading comprehension. This, in turn, implies that depth of L2 lexical knowledge might be as equally important for reading comprehension as vocabulary size, and L2 learners also need to focus on depth of vocabulary knowledge in L2 vocabulary learning to enhance L2 reading comprehension. Second, Liu and Shaw (2001) attempted to study the role of depth of lexical knowledge in L2 writing based on corpus data or writing samples, even though their main focus was on in-depth knowledge of only one particular word *make*. For this study, they looked at the usage of the particular word in writing samples produced by the participants, and compared the non-native speakers' usage of the word with that of native speakers by using corpus data. The result showed that the non-native speakers' lexical knowledge of this common word *make* was not identical to that of native speaker.

In conclusion, this research into the relationships between depth of lexical knowledge and two language skills might not provide a direct account of the interdependent nature of vocabulary and grammar, but rather might give us a broad

understanding of the important role of depth of L2 word knowledge in L2 acquisition or the relationship between depth of lexical knowledge and overall L2 proficiency, reading, or writing. However, if we consider that grammar is one essential component in L2 proficiency development, these research results might implicitly show the connections between vocabulary and grammar in L2 learning.

2.3.3. Summary and Conclusion

To examine how various properties of lexical knowledge would be associated with grammatical knowledge, two specific properties of lexical knowledge such as morphological and syntactic knowledge were chosen as crucial factors that are expected to be linked to grammatical knowledge. Thus, this section has discussed how inflectional and derivational knowledge as morphological property, and argument structures and subcategorization as syntactical property, could be tied to the building of syntactic structures.

Next, since there have been few empirical studies on the connections between depth of word knowledge and grammatical knowledge, we attempted to examine their interdependency indirectly by looking at the relationship between depth of lexical knowledge and overall L2 proficiency, reading or writing. Thus, it was found that there were high and positive correlations between depth of L2 lexical knowledge and L2 proficiency levels or L2 reading comprehension. Depth of lexical knowledge might also be adopted as a good predictor of L2 learners' reading performance, along with

their vocabulary size.

2.4. Conclusion

The current study is primarily concerned with how depth of L2 lexical knowledge is related to L2 grammatical knowledge to investigate the relationships between lexical and grammatical knowledge in L2 acquisition. For this study, L2 research into depth of lexical knowledge and a generative approach to syntax including the latest Minimalist model have been reviewed to summarize a theoretical background of the interdependent nature of grammar and vocabulary in L2 learning and of the role of lexical knowledge in L2 syntactic development.

First, L2 research into multiple properties of vocabulary knowledge (Nation, 1990, 2001; Bogaards, 2000) has indicated the significant roles of depth of L2 lexical knowledge in L2 grammatical development. Thus, depth of vocabulary knowledge can be represented in terms of the extent to which learners know various properties of lexical knowledge (Bogaards, 2000), and, among them, morphological and syntactic properties of lexical knowledge might be possible candidates that can contribute to L2 grammatical development.

Second, generative syntax has provided a theoretical background for the role of lexical knowledge in L2 syntactic development (Chomsky, 1981, 1986, 1995, 2002; Cook, 1996, 1998; Cook & Newson, 1996, 2007, Herschensohn, 2000). This syntactic theory has been developed in the direction of emphasizing the role of lexical information in

constructing syntactic structures, and this theoretical evolution seems to imply that the L2 acquisition of lexical knowledge might be closely connected to syntactic developments in both L1 and L2 acquisition (Cook, 1996; Herschensohn, 2000). In this regard, the latest version of generative syntax called the Minimalist Program (Chomsky, 1995), which places an emphasis on the role of lexical features in deriving syntactic structures, might provide a new way of capturing not only variability and incompleteness of learner language but also the relationships between lexical and grammatical knowledge in L2 acquisition. Thus, within this Minimalist model, L2 syntactic acquisition is understood as being greatly affected by the building of L2 lexicon and universally invariant parts in syntax being determined by UG.

Finally, lexical information about argument structures, subcategorization or morphological features might show why morphological and syntactic properties of lexical knowledge will be connected to grammatical knowledge. In addition, L2 research into the relationships between depth of lexical knowledge and L2 proficiency might implicitly suggest the significant role of depth of vocabulary knowledge in L2 acquisition.

CHAPTER THREE: RESEARCH METHOD

3.1. Research Questions

The main concern of this study was to investigate the relationships between lexical and grammatical knowledge in L2 acquisition of English by Korean EFL learners by examining how different degrees of lexical knowledge that Korean learners have about English verbs are connected to their grammatical knowledge. For this, the following general research question was formulated:

> *Is there any relationship between L2 lexical and grammatical knowledge in the acquisition of English verbs by Korean EFL learners?*

This study focuses on depth of lexical knowledge with respect to L2 lexical development, rather than breadth of vocabulary knowledge, since the in-depth perspective can provide us a chance to look at L2 lexical development through various aspects of lexical knowledge – semantic, morphological, and syntactic. Additionally, the relationships between lexical and grammatical knowledge can be viewed through the lens of generative syntax, in which morphological and syntactic features of each word such as inflection and argument structure might play a crucial role in the building of syntactic structures. Thus, in order to take a closer look at the relationships between L2 lexical and grammatical knowledge in the acquisition of English verbs by Korean EFL learners, the general research question mentioned above was specified as follows:

1) How are the different degrees of lexical knowledge that Korean EFL learners have about English verbs associated with the L2 acquisition of English grammar?

2) Which properties of in-depth lexical knowledge about English verbs contribute most to explaining the variance in the development of Korean learners' L2 English grammar?

It is expected that the first research question might lend preliminary support for the interdependent nature of lexical and grammatical knowledge implied from both L2 research into depth of lexical knowledge and generative syntactic theory. In other words, this research question might provide a partial answer to whether or not lexical and grammatical knowledge are associated with each other, since the current study focuses on only English verbs. This question will also help us understand the role of vocabulary knowledge in the development of L2 proficiency since grammar is regarded as one of the components determining language proficiency. It must also be noted that the issue of the role of vocabulary knowledge in L2 proficiency development is not directly covered in this study.

The second research question is concerned with the issue of which properties of lexical knowledge are most related to the acquisition of L2 grammatical knowledge, given that lexical knowledge includes different types of information about form (written/oral), meaning (conceptual meaning), morphology (inflection and derivation),

syntax (argument structure), collocation, and discourse (style/register/appropriateness) (Richards, 1976, Nation, 1990, 2001). The current study might also provide implications about which properties of vocabulary knowledge should be emphasized in the language classroom in order to enhance L2 learners' grammatical knowledge.

3.2. Participants

106 Korean EFL learners (male: 46, female: 60) at three different universities in Seoul, Korea participated in this study. The participants consisted of 51 students who were taking an English course at their university and 55 students who were taking non-English-related courses. However, among the 55 participants who were taking non-English-related courses, 25 students reported that they were concurrently studying English at private English institutes. Their ages ranged from 18 to 24 years (mean age: 20.9 years). Although their college majors were varied, they all had had at least six years of formal English learning experience before entering the university. In addition, 44 participants reported that they had started to learn English prior to their formal public school English education: their ages for beginning English education ranged from 1 to 13 years (mean age: 8.34 years).

3.3. Research Instruments

A background questionnaire and two instruments – grammar and vocabulary tests – were employed in this study. The background questionnaire was created to gain

the following information on each participant: *age, major, the age of starting to learn English, English courses that they have taken, English proficiency tests that they have taken, average exposure time to English or usage time of English*, and *any particular English words (or parts of speech) and structures each participant perceives to be difficult in producing and comprehending* (See Appendix C). This information was collected to investigate possible variables which might affect the results of this study.

Two tests – a vocabulary test and a grammar test - were used to investigate how different degrees of lexical knowledge about English verbs are related to L2 grammatical knowledge of English.

3.3.1. Depth of Vocabulary Knowledge Test

To measure the depth of vocabulary knowledge about English verbs, i.e. how well given English verbs are known, participants were asked to take a vocabulary test focusing on word meanings, morphological features (i.e. inflection and derivation), and argument structures (or possible structures determined by a given verb). That is, in this vocabulary test, depth of L2 vocabulary knowledge is operationalized by how many properties of lexical knowledge L2 learners have about a given verb: the more properties of lexical knowledge L2 learners know about a given verb, the deeper lexical knowledge they are assumed to have for the given verb. This vocabulary test was designed specifically for the current study, since there have been just a few studies so far on how to measure depth of lexical knowledge (Paribakht & Wesche, 1996; Read, 1998, 2000;

Webb, 2005), and these existing in-depth vocabulary tests are not even appropriate for measuring three properties of lexical knowledge that this study focuses on. Based on L2 research into the types of lexical knowledge proposed so far (Bogaards, 2000; Nation, 1990, 2001), this in-depth vocabulary test consisted of three sections as seen below[33]:

> **Semantic Section (Word Meaning):** To measure learners' knowledge of the semantic traits of a given verb
>
> **Morphological Section (Inflection and Derivation):** To measure learners' knowledge of the inflected or derived forms of a given verb
>
> **Syntactic Section (Argument Structures or Possible Structures):** To measure learners' knowledge of how many and what types of arguments are obligatory or possible with a given verb and by which constituents the argument structures of the verb should be expressed (e.g. NP, PP, *to*-infinitive, gerund or *that*-clause)

This test consists of three parts, and each part has 20 questions (the total number of questions is 60) (See Appendix D). The stimulus words for this vocabulary test were selected from the high-frequency word list (2000 word-level)[34]. Because this vocabulary test is basically for measuring in-depth knowledge, i.e. how well a given word is known, the stimulus words were selected from high frequency words, rather than low frequency

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[33] As discussed in Chapter 2, it has been suggested that there might be other properties of lexical knowledge such as collocation, pragmatic, or discourse characteristics. However, since the current study is primarily concerned with the relationships between lexical and grammatical knowledge, this vocabulary test focuses on grammar-related knowledge among various types of lexical knowledge.

[34] This list was obtained from Rob Waring's homepage. (URL://www1.harenet.ne.jp/~waring/vocab/wordlists/vocfreq.html).

or technical words (Read, 2000). Since low frequency words or technical words are more likely to be unknown by the participants than high frequency words, it might be impossible to measure various properties of the word.

To choose the stimulus words for this test, I first extracted all the verbs from this list of the 2000 most frequent words, since the current study is concerned with only English verbs. The number of extracted verbs was 420. Then I selected every 15th verb from the frequency verb list until I obtained 20 English verbs (e.g. *accept, allow, associate, believe, check, conduct, destroy, drive, examine, fill, hurt, investigate, learn, mark, note, persuade, protect, recognize, remind*, and *send*) . Among the 20 high frequency English verbs selected, 17 verbs were also included in a list of frequent words for TEPS, which was used for measuring the participants' overall grammatical knowledge[35], and two of them (e.g. *believe* and *send*) were found to belong to the 500 most frequent words, which might be much easier to learn than words at the 2000 words level.

In order to measure depth of L2 vocabulary knowledge, the 20 stimulus verbs were repeated in the three sections of this vocabulary test, in which the meanings, morphological features, and syntactic features of each verb were assessed. In the first section, the meanings of given verbs were tested by having the participants write L1 equivalents of the stimulus verbs. The second section covered the morphological features of the same verbs used in the first section by asking the participants to select

[35] 14 verbs out of the 17 English verbs appear as the same root form in the TEPS-prep word list, while three of them are included as derived or inflected forms in the list (e.g. *learned* for *learn*).

one incorrect inflected or derived form of given stimulus verbs from four alternatives. In the third section, the syntactic property of a given word was assessed by having the participants choose one incorrect sentence in terms of argument structures (or possible structures) from four example sentences. All of the example sentences used in this section were extracted from two English Dictionaries for advanced English learners - Macmillan English Dictionary and COBUILD English Dictionary - in order to avoid presenting sentences that might be controversial in their acceptability or grammaticality. Some difficult words that were included in the example sentences (e.g. technical words and low-frequency words such as *carbon emission, masculinity*, and *electoral campaign*) were glossed to prevent unknown words from interfering with the choice of correct answers. Each item was scored one point, and the maximum possible score for each section was 20.

This vocabulary test was piloted to verify its validity and reliability and to ensure that the test scores are sufficiently spread out to obtain a correlation coefficient. For this, the depth of vocabulary knowledge test was administered to 8 Korean English learners who reside in the U.S., and the TEPS vocabulary test[36] as the criterion measure was also given to them in order to see if this in-depth vocabulary test is valid for measuring Korean English learners' vocabulary knowledge. The result indicated that there was a strong correlation between the two types of vocabulary tests (***r*=.882, p < .01**),

[36] Since the grammar test used in this study was also constructed on the basis of TEPS grammar test, it is plausible to use TEPS vocabulary grammar as the criterion measure for testing the validity of the depth of vocabulary knowledge test.

suggesting that this in-depth vocabulary test might be a valid tool for measuring Korean English learners' vocabulary knowledge. Also, the reliability test showed that this vocabulary test can be used as a consistent (i.e. reliable) measure for Korean English learners' depth of vocabulary knowledge (**α=.879**). In addition, another pilot study was also conducted with 13 Korean EFL learners at one Korean university to see if the scores were sufficiently spread out to get a significant correlation coefficient. The result showed that there was a significant positive correlation between vocabulary test scores and grammar test scores (which will be discussed below) (**r=.746, $p < .01$**). This indicated that the score ranges from these two tests were sufficiently spread out. In addition, the mean of the vocabulary test was 32.08 and its standard deviation was 7.97 (**α=.851)**. Finally, 3 native speakers proofread the test to see if the example sentences and related word forms were acceptable to them.

3.3.2. Grammar Test

TEPS (Test of English Proficiency developed by Seoul National University) was used in order to measure the participants' overall knowledge about English grammar. TEPS has been administered nationwide in Korea since 1999, and currently is being used as placement or proficiency tests in many Korean universities[37]. This test consists of 4 parts – Listening Comprehension, Grammar, Vocabulary, and Reading Comprehension.

[37] The test developer reported that this test has received approval from leading scholars of language testing ,such as Bachman and Oller with respect to test validity and reliability.

Unlike the TOEFL test which is aimed to measure academic language skills of those who plan to study in U.S. universities, TEPS aims to test communicative English language skills. Therefore, this test might be more suitable for Korean college students, since the number of students who want to study abroad is relatively small. The Grammar Test Section is originally made up of 50 questions, which are aimed to measure English learners' overall grammatical knowledge for both written and spoken language proficiency. However, in order to measure pure grammatical knowledge that the participants have, each item of the TEPS grammar test was reanalyzed following the content analysis presented in Shiotsu and Weir (2007). They proposed that "knowledge of sentence structures and that of acceptable sequences and forms of words in terms of syntax" should be adopted as a criterion for selecting the items which measure pure grammatical knowledge alone (p. 113). The examples of selected 'pure' grammar items and so-called 'semantically-based' grammar items are as follows:

Figure 3.1: Selected and Eliminated Grammar Test Items

Selected Item

A: _____ my birthday?
B: Your brother told me.
(a) How was it you did know (b) How you did know it was
(c) How did you know it was (d) How did you know was it

. A: Is there anything I can do for you?
B: Please don't forget _____ me to take a pill with each meal.
(a) telling (b) to tell (c) of telling (d) to have told

Eliminated Item

A: How _____ do I have to check this machine?
B: About every twenty minutes.
(a) many (b) much (c) often (d) soon

In particular, as shown in the second selected item, Shiotsu and Weir (2007) also stated that four alternatives need to have similar semantic content, i.e. *tell,* to prevent semantic knowledge from playing a crucial role in choosing a correct answer. Through this content analysis, 41 items were selected from the original 50 items. (see Appendix E). This reanalysis was reviewed by 3 experts including 2 Korean Ph.D students majoring in English education and 1 native speaker English teacher in order to verify my reanalysis of 'pure' grammatical knowledge items. Lastly, glosses were provided for the difficult words used in example sentences (e.g. technical words or low-frequency words like *orthodox Puritanism, intoxicate,* and *scalp*), as shown below.

Figure 3.2: Example of Glossed Test Items

28. In ancient times, criminals' hands might be cut off or _____ as a punishment.
(a) their scalps removed **(b) to remove their scalps**
(c) removing their scalps **(d) they would scalp them**

***scalp: 두피, 머리가죽 (L1 Korean Equivalent)**

Low-frequency words like *scalp* are less likely to be known by the participants than the verb *remove.* This unfamiliarity with the word *scalp* might prevent the participants from concentrating on relevant grammatical knowledge alone. Thus, the use of glosses allowed me to elicit the grammatical knowledge without being greatly affected by unknown words.

3.3.3. Test Administration

The vocabulary and grammar tests were administered to participants in a single session, and the total testing time for the two tests was one hour (background Questionnaire: 5 minutes, vocabulary test: 25 minutes, and grammar test: 30 minutes). All the directions for the two tests were given in Korean to ensure that participants would understand what they were asked to do in each test.

3.4. Data Analysis

Statistical techniques like correlation coefficient and multiple regression were

adopted to analyze all of the data obtained from the vocabulary and grammar tests, and SPSS for Windows was used to do this statistical analysis.

First, to see how vocabulary test scores are correlated with grammar test scores, the vocabulary test scores of the participants were compared with their scores on the English grammar test by using a correlation coefficient (*r*). This statistical analysis was used to examine the relationships between depth of lexical knowledge and grammatical knowledge, i.e. whether or not the depth of lexical knowledge that Korean learners have about English verbs is inter-correlated with their overall knowledge of English grammar.

Second, to investigate which properties of lexical knowledge about the given English verbs might contribute most to predicting the development of L2 English grammar, multiple regression analysis was employed, based on Qian's (1999) research into the role of depth and breadth of lexical knowledge in L2 reading comprehension. For this analysis, semantic, morphological, and syntactic properties assessed by each section of the in-depth vocabulary test were considered as independent or predictor variables, while participants' overall grammatical knowledge measured by the grammar test became the dependent or criterion variable.

The first step in this analysis was to compute inter-correlations between each predictor variable and the dependent variable: *semantic property of lexical knowledge vs. overall grammatical knowledge, morphological property of lexical knowledge vs. overall grammatical knowledge, and syntactic property of lexical knowledge vs. overall grammatical*

knowledge. The next step was to obtain a squared multiple correlation coefficient (R^2), which refers to the variance in the dependent variable that is explained by the predictor variables, by entering each predictor variable to the multiple regression equation (Gall, Gall, and Borg, 2003; Field, 2005). When it comes to the order of entry of predictor variables into the regression equation, the predictor variable that had the highest correlation with the dependent variable, i.e. overall grammatical knowledge assessed by the 'pure' grammar test, became the variable that was first entered into the equation. Then, the predictor variable that had the highest part-correlation[38] with the dependent variable was chosen as the second predictor which was entered into the equation. If the amount of the R^2 increment added by this second predictor variable proves to be significantly different from the R^2 of the first variable, the second one can be taken as another variable that can contribute to the prediction of L2 grammatical knowledge. This statistical analysis was done to examine which properties of lexical knowledge about English verbs would play an important role in predicting L2 learners' grammatical knowledge about English.

Finally, background information on the participants' ages of starting English learning, average English exposure time, or any English courses taken was obtained to explore possible factors affecting the results of this study. Statistical techniques such as independent-samples *t*-test and Pearson product-moment correlation were performed to

[38] In stepwise multiple regression, "variable entry is based initially on the variable with the largest [Pearson correlation coefficient] and on the **part correlation** of the remaining variables" (Field 2005, p. 194)

see how this background information influenced the results of the two tests. The *t*-test was adopted to determine whether or not there were the mean differences between two groups, which were divided by their ages of starting to study English – for both the vocabulary and grammar tests. The correlation coefficient was used to compare the participants' average English exposure time with their scores on both tests.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1. Results

4.1.1. Background Information on the Participants

Before the administration of the vocabulary and grammar tests, the preliminary survey was conducted to obtain participants' background information on age, major, age of first English study, English courses that they had taken, English proficiency tests that they had taken, average exposure time to English, and any particular areas that they perceived to be difficult in learning vocabulary and grammar.

First, the average age of the 106 college students who participated in this study was 20.9 years, and the ranges of their ages were as follows:

Table 4.1: Age Ranges of the Participants

Age Range	*Number of Participants (%)*
18 – 20	36 (33.96%)
21 – 22	57 (53.38%)
23 – 24	10(9.43%)
No Response	3 (2.83%)
Total	**106**

Second, it was reported that 44 participants (41.51%) started to study English prior to formal education as shown in Table 4.2. Their average age of beginning English

learning was 8.34 years. On the other hand, most of the participants who started English learning prior to formal education reported that they had begun to learn English before the age of 13. In fact, it was also found that the participants who started studying English before formal education performed better in the two tests than those who started English after formal education (See Table 4.17). This result indicates that the participants who had studied English for a relatively larger number of years might have better knowledge of English vocabulary and grammar.

Table 4.2: Number of the participants who started to study English prior to their formal education

Pre-Formal English Education				*Formal English Education*	*No Response*
1 – 7	**8 – 10**	**11 - 13**	**Age not specified**		
17/106 (16.04%)	15/106 (14.15%)	9/106 (8.49%)	3/106 (2.83%)	58/106	4/106
44/106 (41. 51%)				(54.72 %)	(3.77%)

Third, some of the participants reported that they had taken or were currently taking English courses at private English institutes (33 participants). In addition, 26 of the 33 participants were found to be taking test preparation courses (TOEIC, TOEFL) or English speaking courses, as shown in Table 4.3.

Table 4.3: Number of the participants who had taken English courses at private English institutes

Participants who had taken or were currently taking English courses				*Participants who had not taken English courses*	*No Response*
Test Preparation	**Speaking**	**Grammar/ Others**	**Not Specified**		
15/106 (14.15 %)	11/106 (10.38%)	4/106 (3.77%)	1/106 (.94%)	71/106 (16.70 %)	4/106 (3.77%)
31/106 (29.25%)					

Fourth, the average time per day for which the participants reported they had exposure to English is given below:

Table 4.4: Average Exposure Time to English

Exposure Time	*Number of Participants*
No Exposure Time	9 (8.49 %)
1– 30 minutes.	36 (33.96%)
31 – 60 minutes	25 (23.58%)
61 – 120 minutes	16 (15.09%)
More than 120 minutes	7 (6.60%)
No Response	13 (12.26%)
Total	**106**

The mean English exposure time of the 93 participants who responded to this question was 62.01 minutes. This means that on average, the participants were exposed to English for approximately one hour per day.

Finally, when they were asked whether or not they had ever taken English proficiency tests such as the TOEIC or TOEFL, 51 participants reported that they had

previously taken the TOEIC, TOEFL, or the TEPS.

Table 4.5: English Proficiency Tests taken by the Participants

Types of English Proficiency Tests							*Number of participants who had never taken English proficiency tests*	*No Response*
TOEIC	**TOEFL**	**TEPS**	**TOEIC/ TEPS**	**TOEFL/ TEPS**	**TOEIC/ TOEFL/ TEPS**	**Not Specified**		
32/106	7/106	1/106	3/106	1/106	1/106	6/106	52/106	3/106
30.19%	6.60%	0.94%	2.83%	0.94%	0.94%	5.66%		
51/106(48.11 %)							(49.06 %)	(2.83 %)

The proficiency test that was taken by the largest number of the participants was the TOEIC, specifically 36 participants reported having taken that test (70.59%). On the other hand, the number of the participants who had taken the TEPS was only 6, which means that most of the participants were not familiar with the TEPS test. This unfamiliarity with the TEPS gives some assurance that the grammar test, which was created based on the TEPS, was an unbiased measure for the participants' knowledge of English grammar. Only 27 participants revealed scores that they had received on these tests, since they were asked to disclose their scores voluntarily.

4.1.2. Depth of Vocabulary Knowledge vs. Grammatical Knowledge

Depth of lexical knowledge about English verbs and overall grammatical knowledge were measured by two tests - the in-depth vocabulary test and the grammar

test, which were designed especially for this study. The results of these two tests are presented in Table 4.6 and Table 4.7.

Table 4.6: Means and Standard Deviations of Test Scores (N = 106)

	Vocabulary Test (Maximum Score = 60)	*Grammar Test (Maximum Score = 41)*
Score Ranges	20 – 52	8 – 35
Mean	36.37 (60.62%)	19.15 (46.71%)
Standard Deviation	6.945	7.481
Reliability (Cronbach Alpha)	.79	.86

Table 4.7: Means and Standard Deviations of Each Section of In-Depth Vocabulary Test (N = 106)

	Semantic Section (Maximum Score = 20)	*Morphological Section (Maximum Score = 20)*	*Syntactic Section (Maximum Score = 20)*
Score Ranges	7 – 20	4 – 18	3 – 16
Mean	17.14 (85.7%)	11.20 (56.0%)	8.03 (40.15%)
Standard Deviation	2.613	2.968	3.514
Reliability (Cronbach Alpha)	.72	.59	.66

As shown in Table 4.6, the means of the two tests were 36.37 (SD: 6.945) and 19.15 (SD: 7.481), respectively. The Cronbach alpha reliability test showed that these two tests measured depth of vocabulary knowledge and grammatical knowledge consistently (Vocabulary Test: alpha =. 79 and Grammar Test: alpha = . 86). Table 4.7 shows the score ranges, means, and standard deviations of each section of the vocabulary test.

The mean of the semantic section was higher than that of the other two sections, while the syntactic section showed the lowest mean.

To see how the participants' depth of vocabulary knowledge was related to their grammatical knowledge, the scores of the two tests were compared using a one-tailed Pearson product-moment correlation. Since the proportional relationships between lexical and grammatical knowledge - the more lexical knowledge the participants have, the more grammatical knowledge they have or vice versa - were expected on the basis of the literature review on the development of lexical and grammatical knowledge, a one-tailed test was adopted for this analysis. The statistical analysis indicated that there was a high positive correlation between the results of the two tests (Table 4.8). The strong correlation between depth of lexical knowledge and grammatical knowledge is illustrated in Figure 4.1.

Table 4.8: Correlation between Depth of Vocabulary Knowledge Test and Grammar Test

	Grammar Test
Vocabulary Test	**.815****

**Correlation is significant at the 0.01 level.

Figure 4.1: Scatterplot of Grammar Test against In-Depth Vocabulary Test

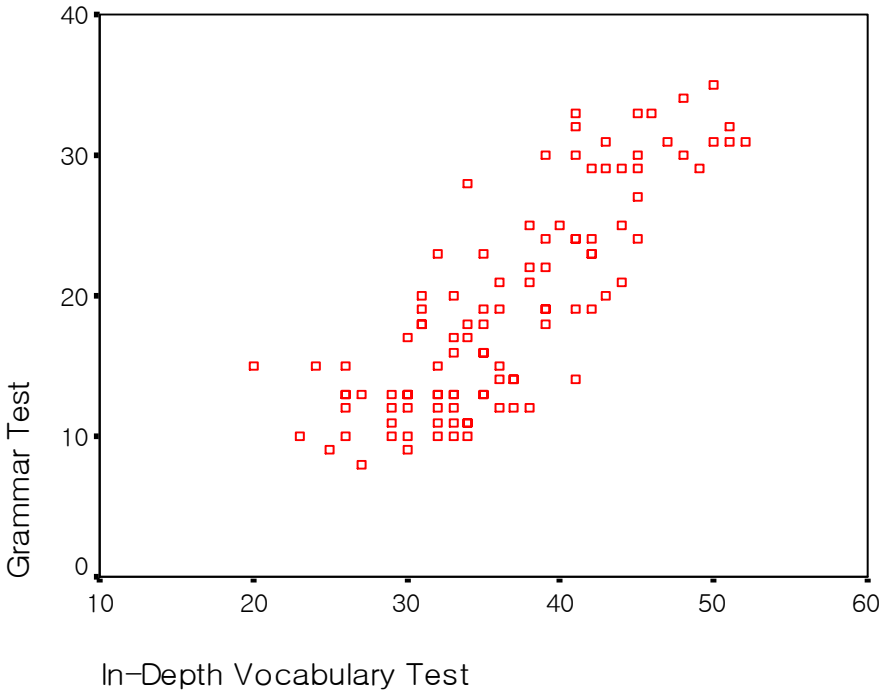


Table 4.9 shows how the grammar test and each section of in-depth vocabulary test were correlated with one another.

Table 4.9: Correlations between Grammar Test and Each Section of Vocabulary Test

	Semantic Section	*Morphological Section*	*Syntactic Section*
Grammar Test	**.518****	**.559****	**.754****

**Correlation is significant at the 0.01 level

The grammar test was found to be significantly correlated with each part of the in-depth vocabulary test ($p < .01$), and among them, the syntactic section focusing on the possible structures of a given English verb showed the highest correlation with the grammar test

(r = .754). The other two sections for measuring the participants' knowledge of word meanings and derivation/inflection had similar moderate correlations with the grammar test (r = .518 and r = .559). Consequently, this result about the intercorrelations between the grammar test and each section of the vocabulary test might inform us of which parts of the vocabulary test could be used as possible predictors to explain the variance of grammatical development or which parts would contribute most to the prediction of the development of L2 grammatical knowledge.

On the other hand, the finding that the syntactic section was more correlated with the grammar test scores than the semantic section appears to be compatible with the earlier theoretical consideration about which properties of lexical knowledge would be more correlated with grammatical knowledge. However, the finding that the morphological and syntactic sections did not show a similar correlation with the grammatical knowledge seems to be inconsistent with the prediction that both morphological and syntactic properties of vocabulary knowledge will be highly correlated with grammatical knowledge. Specifically, when each pair of the three sections of the vocabulary test was compared with the grammar test, the following result was obtained as shown in Table 4.10.

Table 4.10: Correlations Between Grammar Test and Each Pair of Three Sections of Vocabulary Test

	Semantic + Morphological	*Semantic + Syntactic*	*Morphological + Syntactic*
Grammar Test	**.688****	**.780****	**.777****

**Correlation is significant at the 0.01 level.

This result also seems to be opposite to the previous theoretical consideration that morphological and syntactic properties of lexical knowledge might be directly associated with L2 learners' overall grammatical knowledge. Thus, as shown in Table 4.10, the correlation between the semantic and syntactic sections and the grammar test was found to be similar to the correlation between the morphological and syntactic sections and the grammar test (***r*=.780 vs. *r*=.777**). This result also seems to confirm that the morphological property of lexical knowledge might not be as closely correlated with the acquisition of grammatical knowledge as its syntactic property.

4.1.3. Multiple Regression of Three Properties of Lexical Knowledge on Grammatical Knowledge

Multiple regression analysis was adopted in order to determine the extent to which semantic, morphological or syntactic properties of lexical knowledge contribute to explaining the variance in grammatical development. For this analysis, semantic, morphological, and syntactic properties assessed by each section of the in-depth vocabulary test were considered independent or predictor variables, while the

participants' overall grammatical knowledge measured by the grammar test became a dependent or criterion variable. Stepwise multiple regression analysis was employed to verify the theoretical considerations of the relationships between each property of L2 lexical knowledge and grammatical development. Based on L2 research into lexical knowledge and a generative approach to syntax, morphological and syntactic properties are expected to play important roles in the prediction of learners' English grammar knowledge. This stepwise regression method decides the order in which predictors are entered into the regression equation based on the extent to which the magnitude of R^2 increases by the addition of the predictor variable, i.e. a purely mathematical criterion (Gall et al., 2003; Field, 2005). Thus, this stepwise method might be appropriate for confirming the prediction about which properties of lexical knowledge can serve as major predictors of explaining grammatical development and which property plays a minor role in the prediction of learners' grammatical knowledge. Thus, this multiple regression analysis focused on detecting the changes of the R^2, i.e., the variance in participants' grammatical knowledge that was accounted for by three predictor variables such as semantic, morphological, and syntactic properties of lexical knowledge. The results of the multiple regression analysis conducted by SPSS for windows are summarized as follows:

Table 4.11: Stepwise Multiple Regression of Each Section of Vocabulary Test on Grammatical Knowledge

Order of Entering Predictors	*Correlation*		*R*	R^2	R^2	*b-value*[a]
	Pearson *r*	**Part**[a]			*Increment*	
Syntactic Section	.754	.453	.754	.568	.568**	1.149**
Semantic Section	.518	.229	.792	.627	.059**	.714**
Morphological Section	.559	.226	.824	.678	.051**	.642**

** Significant at the 0.01 level.

[a] It should be noted that these **part correlations** and *b-value* is the value at the final step, not at the initial or second step, i.e. when all three predictors were entered into the model.

First, the syntactic section was entered into the regression equation, since the section was the predictor variable which had the highest correlation with the grammar test. R^2 was .586 (F= 136.773, p <.01). Next, the second predictor variable that was entered into the model was the semantic section, since in stepwise multiple regression, the entry of the second or later predictor is determined by its part correlation, which refers to the correlation between the predictor and dependent variables, controlling for the effect that the other two variables have on the dependent variable (Field, 2002, p. 194). Thus, the addition of the semantic section increased the magnitude of R^2 by .059 to .627, or explained 5.9% more variance in grammatical knowledge (F = 16.384, p < .01). At the final stage, when the morphological section was entered into the regression equation, the size of R^2 was changed to .678 (F = 16. 206, p < .01). This means that .051, or 5.1% more variance in grammatical knowledge was accounted for by the entry of the

third predictor, morphological section. In addition to the R^2 change, the *b*-value of each predictor variable, which refers to whether the predictor is making a significant contribution to the equation (Field, 2005), shows that all three variables contribute significantly to the prediction of the dependent variable.

As seen above, since the addition of each predictor variable to the regression equation each resulted in statistically significant R^2 change and *b*-value, it is considered that all three sections of the in-depth vocabulary test can be used as valid predictors to explain the variance in grammatical development. More importantly, it was observed that the syntactic section made the greatest contribution to the prediction of L2 English grammatical knowledge, as expected by the theoretical consideration that morphological and syntactic information of each word might be more important in predicting grammatical knowledge than its semantic information. However, the next important contributor to predicting grammatical knowledge turned out to be the semantic section, not morphological one, even though the difference in their R^2 values was not large. In other words, this result might be incompatible with the earlier prediction that syntactic and morphological properties of lexical knowledge might be more closely linked to overall grammatical knowledge than its semantic property.

On the other hand, we also need to check the collinearity between the three predictor variables. If two or more predictor variables are highly correlated, it is impossible to conclude that each independent variable functions as an individual predictor to explain the variance in a dependent variable. That is, the possibility that

the highly correlated two or more predictors account for the same variance in the dependent variable might be increased (Gall et al., 2003; Field, 2005). For identifying this collinearity, we first need to take a look at the correlation matrix showing the intercorrelations between each predictor variable as seen in Table 4.12.

Table 4.12: Intercorrelations Between Semantic, Morphological, and Syntactic Sections of In-Depth Vocabulary Test

	Semantic Section	*Morphological Section*	*Syntactic Section*
Semantic Part	---		
Morphological Part	**.228***	---	
Syntactic Part	**.390****	**.458****	---

* Correlation is significant at the 0.05 level. **Correlation is significant at the 0.01 level.

In general, when the correlation coefficient is above .80 or .90, it is thought that there exists collinearity between predictor variables. The correlation matrix presented above shows that there was no such collinearity between the predictors – semantic, morphological, and syntactic sections of the vocabulary test, in that their correlation coefficients all were below .50. In addition to this kind of 'scanning' method, we can consult various statistical measures provided by SPSS to ensure that there is no collinearity between the predictor variables used in this multiple regression.

Table 4. 13: Collinearity Diagnostics

	Tolerance	*VIF*
Syntactic Part	.705	1.419
Semantic Part	.845	1.183
Morphological Part	.787	1.270

VIF indicates "whether each predictor has a strong linear relationship with the other predictors" (Field 2005, p. 175). When its value is greater than 10, it might be problematic with respect to collinearity. Tolerance statistic refers to 1/VIF, and if its value is below .1, there might be collinearity between relevant predictors (Field, 2005). Thus, these diagnostic tests confirmed that there was no collinearity among the three predictor variables. The results of this collinearity test ensured that the three sections of in-depth vocabulary test can be used as a valid tool for assessing semantic, morphological, and syntactic properties of L2 lexical knowledge, in that each section succeeds in measuring relatively different constructs, i.e. semantics, morphology, and syntax.

4.1.4. Depth of Vocabulary Knowledge vs. L2 Proficiency Levels

Although the current study did not directly address the relationships between depth of lexical knowledge and L2 proficiency, statistical analysis for the correlation between them might provide insight into the role of depth of lexical knowledge in L2 acquisition. 27 participants out of those who reported that they had ever taken the TOEFL, TOEIC, or the TEPS revealed their scores that they received on those tests.

Since most of the participants took TOEIC, while 4 participants took either TEPS or TOEFL (one and three, respectively), TOEIC[39] was chosen as a criterion measure for the participants' proficiency level. The scores from the other two tests were converted to TOEIC scores based on the Score Conversion Table provided by Language Education Institute at Seoul National University. The means and SDs of the 27 participants' scores on the grammar test, the vocabulary test, and the TOEIC are presented in Table 4.14.

Table 4.14: Means and SDs of Grammar Test, Vocabulary Test, and TOEIC (N=27)

	Grammar Test (Maximum Scores = 41	*In-Depth Vocabulary Test(Maximum Scores = 60)*	*TOEIC (Maximum Scores = 990)*
Score Ranges	11 -35	31 – 52	453 - 965
Mean	23.70	41.52	773.00
Standard Deviation	7.775	6.154	136.047

When the vocabulary test scores and the TOEIC scores, or the grammar test scores and the TOEIC scores were compared by Pearson correlation *r*, the result showed that there were positive correlations between the TOEIC scores and their vocabulary or grammar test scores, as shown below (Table 4.15). Their positive correlations are illustrated in Figures 4.2 and 4.3.

[39] "The *Test of English for International Communication* (TOEIC) is an English language test designed specifically to measure the everyday English skills of people working in an international environment. The test is widely accepted by corporations, English-language programs, and government agencies around the world" (from TOEIC official Web site: www.ets.org/toeic/)

Table 4.15: Correlations Between Grammar Test, Vocabulary Test, and TOEIC (N=27)

	Grammar Test	*In-Depth Vocabulary Test*
TOEIC	**.700****	**.709****

** Correlation is significant at the 0.01 level.

Figure 4.2: Scatterplot of Grammar Test Scores against TOEIC Scores

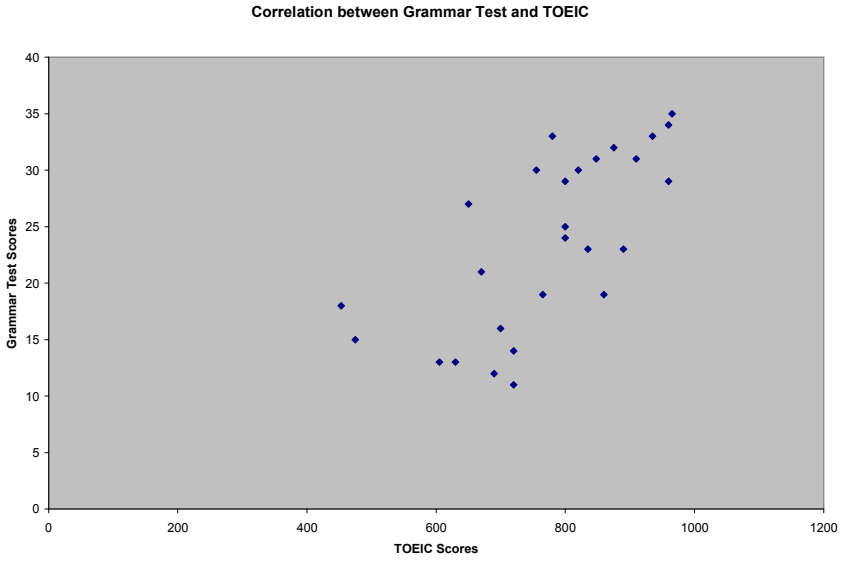
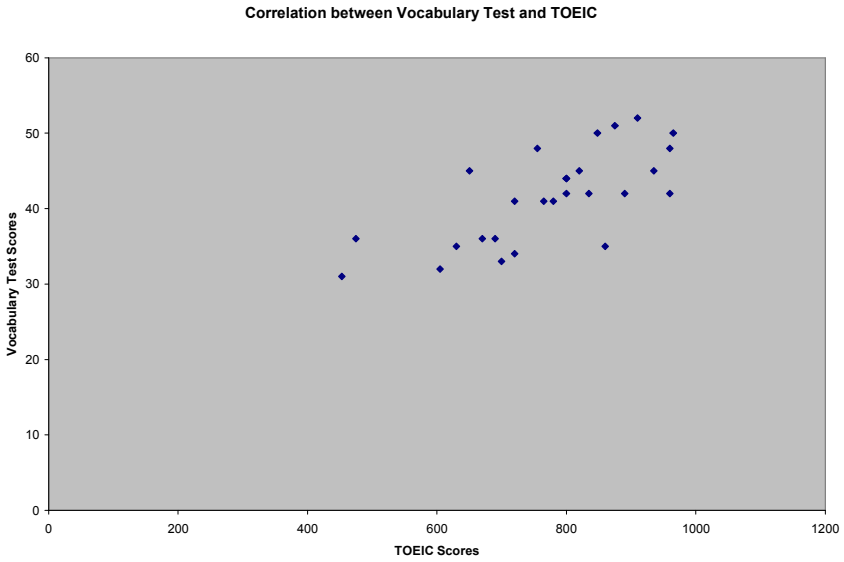


Figure 4.3: Scatterplot of Vocabulary Test Scores against TOEIC Scores



Even though the two correlations appear to be similar to each other, the depth of vocabulary knowledge test was slightly more correlated with the TOEIC scores than the grammar test was. Specifically, multiple regression analysis showed that the in-depth vocabulary test can be used as a better predictor variable to explain the variance in the participants' TOEIC score.

Table 4.16: Multiple Regression Analysis of Vocabulary and Grammar Tests on TOEIC Scores

	R	R^2	R^2 *Increment*
Vocabulary Tests	.709	.503	.503**
Grammar Tests	.733	.537	.043

**Significant at the 0.01 level

As shown above, the entry of the second predictor variable – the grammar test scores –

increased the magnitude of R^2 only by .034 (3.4%). Furthermore, since this change in R^2 was not significant at the 0.1 level, the grammar test does not seem to be a better predictor compared with the vocabulary test. On the other hand, we still need to be careful when we attempt to generalize this result obtained from a relatively small sample number (N = 27), in that at least 15 data per predictor are required in the multiple regression analysis as a rule of thumb.

4.1.5. Vocabulary and Grammar Tests vs. Participants' Backgrounds

This section will deal with the relationships between some background information on the participants and the test scores obtained from the two tests. As reported in Section 4.1.1, information on their age of their initial English study, English courses they had previously taken, and their average English exposure time per day was obtained from the background questionnaire.

First, it was found that the participants who had begun to study English prior to formal education obtained better scores on both vocabulary and grammar tests than those who had learned English through formal education. To test this superiority of the early English-learning group statistically, an independent-sample *t*-test[40] was conducted. The results from this statistical test indicated that there were significant mean differences between the two groups (Pre-Formal Education Group vs. Formal

[40] This type of *t*-test is used to determine if there is a difference between two means taken from different samples.

Education Group) in both tests, as presented in Table 4.17. The performance of Pre-Formal Education Group on both tests were significantly better than that of Formal Education Group (Vocabulary Test: t=3.946, p < .001 and Grammar Tests: t=3.494, p < .001).

Table 4.17: *T*-test of the Mean Difference Between Two Groups on Vocabulary and Grammar Tests

	Vocabulary Test		***Grammar Test***	
	Pre-Formal Education Group (N=41)	Formal Education Group (N=58)	Pre-Formal Education Group (N=41)	Formal Education Group (N=58)
Mean	39.46	34.24	22.02	17.02
SD	6.577	6.422	8.15	6.11
t-value	3.946		3.494	
alpha level	P < .01		P < .01	

On the other hand, to investigate the relationship between the length of English learning and knowledge of vocabulary and grammar in more detail, how the results of each test are correlated with the different ages of starting to study English was examined within Pre-Formal Education Group (age ranges: 1 year – 12 year). The result indicated that their ages of receiving their first English education and their lexical or grammatical knowledge were uncorrelated with each other (Grammar Test vs. Ages of beginning English learning: r= -.195, p < .221 and Vocabulary Test vs. Ages of beginning English learning: r= -.126, p < .432). This finding cannot be seen as clear evidence for a positive relationship between the length of English learning and the development of lexical and

grammatical knowledge, however, since the age effect seems to exist just dichotomously, i.e. pre-formal education group vs. formal education group, not incrementally.

Second, whether the participants had ever taken English courses might not have had any positive effect on their lexical and grammatical knowledge. The mean differences in the two test between the two groups – English-Course-Taken-Group(EG) and English-Course-Not-Taken-Group (ENotG) were examined as given in Table 4.18.

Table 4.18: *T*-test of the Mean Difference Between Two Groups on Vocabulary and Grammar Tests

	Vocabulary Test		*Grammar Test*	
	EG (N=31)	ENotG (N=71)	EG (N=31)	ENotG (N=71)
Mean	34.52	37.21	17.26	19.71
SD	5.61	7.26	6.27	7.86
t-value	-1.839		-1.541	
alpha level	P < .069		P<.127	

The independent-samples *t*-test indicated that there were no significant mean differences between the two groups in both tests as shown in Table 4.19. The means of two groups (vocabulary test: 34. 52 vs. 37.21 and grammar test: 17.26 vs. 19.71) indicated that the group who had taken English courses performed worse on both tests than the group who had not taken them.

Finally, with regard to the relationships between English exposure time and the development of lexical or grammatical knowledge, it was found that both vocabulary and grammar test results were not correlated with the participants' average exposure time to English per day, as presented below.

Table 4.19: Correlations between English Exposure Time and Vocabulary/Grammar Tests

	In-Depth Vocabulary Test	*Grammar Test*
English Exposure Time per Day	-.183 (P < .079)	-.176 (P < .091)

In sum, background information on the participants' ages of initial English study, English courses they had taken, and their average English exposure time per day English was obtained to explore possible variables which might affect the results of this study. The results showed that besides the age of their initial English study, other variables such as English courses and exposure time were found to have no or little influence on the participants' performance on both tests.

4.2. Findings and Discussion

4.2.1. Major Findings

The current study has addressed the following two research questions about the relationships between lexical and grammatical knowledge in L2 acquisition of English by Korean adult learners.

Research Question 1: *How are the degrees of lexical knowledge that Korean EFL learners have about English verbs associated with the L2 acquisition of English grammar?*
Research Question 2: *Which properties of in-depth lexical knowledge about English verbs contribute most to explaining the variance in the development of Korean learners' L2 English grammar?*

As discussed earlier, L2 research on multiple properties of lexical knowledge or depth of L2 lexical knowledge and L1-based generative syntactic theory might provide tentative answers to these research questions. First, L2 vocabulary researchers have identified the morphological and syntactic features of a given word as major properties of depth of lexical knowledge that L2 learners should master in their L2 vocabulary learning, along with word meanings (Nations, 1990, 2001; Gass, 1999). These multiple properties of vocabulary knowledge might contribute to the acquisition of grammatical knowledge, in that grammatical knowledge in general refers to both morphological and syntactic knowledge. Second, a generative approach to syntax has placed more and more emphasis on the role of lexical knowledge in constructing sentence structures by claiming that information on the argument structures or subcategorization of verbs might decide what the basic syntactic structure would look like. This claim implies that lexical and grammatical knowledge in L2 acquisition might also be closely connected to each other. As a result, these theoretical considerations might give us the following predictions about the two questions.

Prediction 1: *Depth of lexical knowledge that Korean EFL learners have about English verbs will be correlated with their knowledge of L2 English grammar*
Prediction 2: *Morphological and syntactic properties of in-depth lexical knowledge about English verbs will contribute more to explaining the variance in the development of Korean learners' L2 English grammar than its semantic property.*

The next sections will deal with whether these theory-based predictions about the relationships between vocabulary and grammar in L2 learning can receive empirical support from the test results presented in the above sections.

4.2.1.1. Research Question One: Connections Between Lexical and Grammatical Knowledge

The first research question was about the relationships between lexical and grammatical knowledge in the L2 acquisition of English by Korean adult learners. Specifically, this question focused on the depth of lexical knowledge about English verbs with respect to vocabulary acquisition. Depth of lexical knowledge, which can be compared with breadth of lexical knowledge also known as vocabulary size, was operationalized by how many properties of lexical knowledge L2 learners have about a given word (Bogaards, 2000).

The results from two tests – the depth of vocabulary knowledge test covering semantic, morphological, and syntactic properties of a given English verb and the grammar test focusing on pure grammatical knowledge – showed that the lexical and grammatical knowledge was highly correlated (r=.815, p<.01). Thus, the result seems to confirm empirically the prediction regarding the first research question: the different degrees of lexical knowledge that Korean EFL learners have about English verbs are in proportion to their overall grammatical knowledge about L2 English.

Specifically, the syntactic section of the in-depth vocabulary test showed a higher

correlation with grammatical knowledge (*r*=.754) than the other two sections (*r*=.518 and *r*=.559). This finding implies that the syntactic property as one of the components representing depth of vocabulary knowledge might play a crucial role in connecting lexical and grammatical knowledge. On the other hand, it was found that the morphological property of a given English verb did not show as high a correlation with grammatical knowledge as did its syntactic property. Rather, the correlation between the morphology property of lexical knowledge and grammatical knowledge was similar or just a little higher than that between the semantic property and grammatical knowledge, as in *r*=.559 and *r*=.518, respectively. This finding seems to be contrary to the expectation that the morphological aspect of vocabulary knowledge might contribute as much to the development of grammatical knowledge as its syntactic aspect. Furthermore, this finding seems to be inconsistent with the recent generative syntactic model, which stresses the importance of morphological knowledge in the derivation of syntactic structures. These results, in fact, lead to the second question about which lexical property will be a good indicator of L2 learners' grammatical knowledge.

4.2.1.2. Research Question Two: Grammatical knowledge and Multiple Properties of Vocabulary Knowledge

The focus of the second research question was to investigate which properties of lexical knowledge about a given English verb contribute most to the prediction of their L2 English grammatical knowledge. As mentioned earlier, based on L2 research into

multiple lexical properties and a generative approach to the role of the lexicon in grammar construction, it was expected that the morphological and syntactic information of a given English verb might contribute most to predicting overall grammatical knowledge.

Multiple regression analysis showed that all of these properties were qualified as possible predictors of L2 English learners' grammatical knowledge, and the relative importance of each lexical property in predicting L2 English grammatical knowledge was as follows: ***syntactic property > semantic property ≈ morphological property***[41]**.** As predicted, the syntactic property of lexical knowledge proved to serve an important role in explaining the variance in L2 learners' grammatical development. However, it was found that the morphological property was not as important in the prediction of learners' grammatical knowledge as the syntactic property. Rather, the result from statistical analysis showed that the semantic section of the vocabulary test contributed more to explaining the variance of L2 grammatical development than its morphological section, as shown in the R^2 change by the addition of each section, even though the difference between them was not large. Consequently, it seems that this empirical evidence partly confirms the prediction about the second research question: the syntactic property of English verbs makes the greatest contribution to the prediction of L2 English

[41] Statistically, the semantic section was found to be the second predictor which should be entered into the regression equation. However, since the extent to which the semantic and morphological properties contribute to the prediction of L2 grammatical knowledge was, in fact, similar, the relative importance of the two properties as the predictor was represented as the symbol '≈'.

learners' overall grammatical knowledge, while their semantic and morphological properties contribute similarly to the prediction of L2 English grammatical knowledge.

This finding about the relative importance of each property of lexical knowledge as the predictor of grammatical knowledge also seems to be consistent with the correlations between each property of lexical knowledge and grammatical knowledge, particularly because the correlation between the morphological aspect and grammatical knowledge was similar to that between the semantic aspect and grammatical knowledge (See Table 4.9, r=.559 vs. r=.518, respectively). When the grammar test scores were also compared with each pair of three sections of the vocabulary test (See Table 4.10), the semantic and syntactic pair and the morphological and syntactic pair were similarly correlated with the grammar test (r=.780 vs. r=.777, respectively). This result might lead us to conclude that the morphological property of lexical knowledge about L2 English verbs cannot be qualified as at least a better predictor than the semantic property. This means that the two properties of lexical knowledge contribute similarly to explaining the variance in L2 English grammatical development.

More importantly, depth of lexical knowledge, which is represented by multiple properties of vocabulary knowledge such as semantic, morphological, and syntactic, might be used as a more valid tool for explaining learners' grammatical knowledge than breadth of lexical knowledge. L2 learners' breadth of lexical knowledge is determined just by whether they know the meanings of given words. Thus, this breadth-based view might not provide an adequate account of the interdependent nature of vocabulary

and grammar, in that this view is primarily concerned with the semantic property of a given word, but not with its syntactic and morphological properties. Consequently, depth of vocabulary knowledge might be more useful for not only predicting L2 learners' grammatical knowledge but also accounting for the interdependent nature of lexical and grammatical knowledge.

4.2.1.3. Depth of Vocabulary Knowledge and L2 Proficiency

The relationship between L2 learners' depth of vocabulary knowledge and L2 proficiency levels were investigated through the TOEIC scores revealed by some of the participants. The result showed that the participants' scores on TOEIC were positively correlated with their scores of in-depth vocabulary test (N= *27*, r=.709, $p < .01$), suggesting that there might be a positive correlation between depth of L2 vocabulary knowledge and L2 proficiency levels.

Even though grammar test scores were also found to be significantly correlated with the TOEIC scores, multiple regression analysis revealed that the depth of vocabulary knowledge test was a better indicator of their L2 proficiency levels than the grammar test (See Table 4.16). That is, although the grammar test was also found to have a relatively high correlation with the TOEIC scores (r=.70, $p < .01$), the finding that the grammar test and the in-depth vocabulary test showed collinearity (correlation

coefficient r = .851[42]) indicated that two constructs assessed by the two tests – depth of vocabulary and grammatical knowledge - in fact, explained the same variance in L2 proficiency level, and only one of them should be selected for the predictor variable. Specifically, multiple regression analysis showed that when the vocabulary test scores were already entered into the equation, the addition of the grammar test scores did not lead to a significant R^2 change. This statistical analysis thus confirmed that depth of vocabulary knowledge might be adopted as a better predictor for L2 learners' proficiency level than grammatical knowledge.

4.2.1.4. Lexical/Grammatical Knowledge and Other Variables

The participants' ages of their initial English study, English courses that they had ever taken, and their exposure time to English can be considered possible variables that might to some extent affect their performance on the two tests. First, the length of English learning seems to have a positive effect on the acquisition of L2 lexical and grammatical knowledge. The group who had started to learn English prior to formal education showed higher scores on the two tests than the group who had begun to study English through formal education. However, since the Pre-Formal Education Group did not show any positive correlation between their length of learning English and their scores on both tests, this result failed to support the widespread belief that the longer

[42] As a rule of thumb, if the correlation between two predictor variables is above .80, it is considered that there is collinearity between the two predictors.

language learners study their L2 the better their L2 abilities are. Consequently, although it was found that Korean adult EFL learners who had studied English for a relatively longer time had better knowledge of English vocabulary and grammar, it still remains unresolved as to whether or not this result really supported the important role of the length of language learning in L2 English lexical and grammatical knowledge.

Next, whether or not the participants had ever taken extra English courses at private English institutes did not seem to have any effect on their scores on both tests (See Table 4.18). This seems to suggest that their additional efforts to learn English might not be considered a factor affecting their English lexical and grammatical knowledge, at least at the time of the two tests being administered. In addition, even though the participants' English exposure time was expected to have a positive effect on their lexical and grammatical knowledge, this variable was uncorrelated with their scores on the two tests. This finding also seems to show that participants' knowledge of vocabulary and grammar might be unrelated to their English exposure time or vice versa.

In conclusion, we have briefly looked at how the participants' ages of starting English learning, extra English courses, or English exposure time influenced the participants' test scores. Since these variables did not have a great impact on their test performance or show any correlation with their scores of the two tests, we might not need to take into consideration these variables as possible factors affecting the results of this study. On the other hand, we need to be careful when we attempt to extend these

findings to other Korean EFL learners, since the data discussed here were obtained through a simple background questionnaire, but not through a carefully designed research method.

4.2.2. Discussion

4.2.2.1. Interdependent Nature of Depth of Vocabulary Knowledge and Grammatical Knowledge

The major finding from the current study might be straightforward: there is a close relationship between lexical and grammatical knowledge in L2 acquisition of English by Korean adult learners. This finding seems to provide empirical evidence against the belief that vocabulary and grammar are separate linguistic components that might be developed independently of each other.

On the other hand, even if we acknowledge that lexical and grammatical knowledge are highly correlated, the question still remains as to why these two components show such a correlation in their development. If we say that those who know many L2 words tend to know much about L2 grammar or vice versa, this account might be based entirely on the meaning-based and quantity-based perspectives of lexical knowledge. In other words, L2 learners who know an immense number of words including difficult or low-frequency words are more likely to have better grammatical knowledge than those who do not. In this case, whether or not L2 learners know a certain word tends to be determined only by whether they know its meaning.

However, this semantic-based and quantity-based account might not be adequate to give us a reason for why word meanings can be associated with the acquisition of L2 grammar.

In this regard, it might be meaningful that the current study focused on depth of vocabulary knowledge rather than breadth of vocabulary knowledge (Read, 1993, 1998, 2000, 2004; Schmitt, 1994; Henriksen, 1999; Qian, 1999). For this study, the construct, *depth of lexical knowledge*, was operationalized by the multiple properties of vocabulary knowledge: semantic, morphological, and syntactic. Thus, this in-depth view on lexical knowledge might provide a more plausible explanation of the interdependency of lexical and grammatical knowledge, since the multidimensionality of depth of lexical knowledge makes it possible to identify a specific lexical property that might be connected to grammatical knowledge, compared with when we rely on the word meanings alone. The current study found that the syntactic property of English verbs had the greatest correlation with grammatical knowledge and contributed most to the prediction of grammatical development.

More importantly, by selecting high-frequency words as the stimulus words for the depth of vocabulary test, this study attempted to discover how the morphological and syntactic properties of vocabulary knowledge would be associated with grammatical knowledge. The meanings of the high-frequency words are more likely to be known by many L2 learners than the morphological and syntactic features of them. Thus, the use of high-frequency words might allow us to examine more accurately the

role of the morphological and syntactic properties in L2 grammatical development, by minimizing the influence of the semantic property of lexical knowledge and maximizing the effect of the morphological and syntactic ones. If low-frequency or difficult words are selected for the stimulus words, the participants might not even know the meaning of the difficult words, which in turn makes it difficult to measure the other properties of lexical knowledge. As a result, the use of high frequency words as the stimulus words seems to allow us to assess depth of L2 lexical knowledge represented by multiple properties: semantic, morphological, and syntactic.

In fact, this intention was partly supported by the test results in which the participants obtained a significantly higher mean score on the semantic section of the vocabulary test than on the other two sections ($p < .01$): semantic section (17.14/20.0) > morphological section (11.20 / 20.0) > syntactic section (8.03 / 20.0). In other words, the different mean scores in each section seem to reflect the assumption that even though many L2 learners are familiar with the meaning of the high-frequency words, their knowledge about other properties of lexical knowledge might be varied. This approach might be more useful for exploring the effect of depth of lexical knowledge in the development of L2 grammatical knowledge. If the semantic property alone is adopted to look at the relationships between lexical and grammatical knowledge, the correlation coefficient might be just r=.518, as shown in the correlation coefficient between the semantic section of the in-depth vocabulary test and the grammar test (See Table 4.9). However, when all three properties were entered into the correlation with grammatical

knowledge, the correlation coefficient increased to *r*=.815. Again, this might suggest the importance of the in-depth view on lexical knowledge in L2 acquisition, particularly as far as high-frequency words are concerned. The importance of depth of lexical knowledge might also be corroborated by the result that three parts of the vocabulary test were all qualified as possible predictors to explain the variance in L2 learners' grammatical development, even though the degrees of the contribution of each part were varied.

Consequently, the interdependent nature of vocabulary and grammar in L2 learning seems to be captured more accurately by this in-depth view on vocabulary knowledge. This advantage of such an in-depth perspective on lexical knowledge also seems to be evident in the finding that depth of vocabulary knowledge might be a better predictor for L2 learners' overall proficiency assessed by the TOEIC, compared with grammatical knowledge.

4.2.2.2. A Generative Approach to the Interdependent Nature of Lexical and Grammatical Knowledge

Along with this in-depth approach to vocabulary knowledge, another theoretical framework for this study was generative syntactic theory (Chomsky, 1957, 1965, 1981, 1986, 1995) in which the role of lexical information in the construction of grammatical structures has been emphasized throughout its theoretical evolution. Specifically, the latest model of generative syntax reduces the role of syntactic components to a few

universal principles like *move* and *merge,* and maximizes the role of the lexicon by claiming that the derivation of sentence structures might start from the lexicon or the lexical properties of a head word. In terms of language acquisition, thus, this generative syntactic model seems to suggest that language learning should be seen as a matter of gradual building of the lexicon or lexical properties of a given word. Based on this generative approach to syntax, some L2 researchers proposed that L2 acquisition might also be understood in such a way that vocabulary learning should be a major task for L2 learning (Cook, 1996; Cook & Newson, 1996, 2007; Herschensohn, 2000). Since these L2 researchers take the position that universal principles, which are innate to all humans, are available in even L2 acquisition (Herschensohn, 2000; Kim, 2000; Hopp, 2005), L2 learners do not need to pay much attention to the core grammar provided by the universal principles, but need to spend more time on the acquisition of multiple properties of vocabulary knowledge (Cook, 1994, 1996, 1998).

This generative view that lexical knowledge might play a crucial role in L2 learning in general and L2 grammar construction in particular implies that lexical and grammatical knowledge might be closely related in L2 acquisition. This implication about the relationships between vocabulary and grammar from the generative approach seems to be supported by the finding that there was a high positive correlation between lexical and grammatical knowledge in L2 acquisition of English by Korean adult learners. Although this observed high correlation between lexical and grammatical knowledge can tell us nothing about the relative importance of lexical knowledge over

grammatical knowledge or a causal relation between the two types of linguistic knowledge, the finding about the correlation might provide empirical evidence for how the argument structures of English verbs, which have been incorporated as one of lexical properties in generative syntax, would be closely linked to the construction of L2 grammar.

In this regard, one important finding from the current study was that the syntactic property of a given English verb made more contributions to the prediction of Korean English learners' overall grammatical knowledge than any other properties such as the semantic and morphological features of the English verbs. The syntactic section of the vocabulary test covered the argument structures or subcategorization of the stimulus English verbs by asking how many and what types of arguments (e.g. agent, patient, goal, or instrument roles) are obligatory or possible with a given verb and by which constituents the argument structures of the verb should be expressed (e.g. NP, PP, *to*-infinitive, gerund or *that*-clause). In addition, since lexical information about the internal and external arguments of verbs determines which argument should be assigned to the object position or the subject position (Ouhalla, 1994), the syntactic property of verbs is considered to decide the basic structures of the sentences. Thus, the results that this syntactic section (of the vocabulary test) focusing on the argument structures were highly correlated with the grammar test (r=.754), or that the syntactic section contributed most to the prediction of grammatical knowledge showed how the idiosyncratic lexical knowledge about syntactic features of individual English verbs

would be closely connected to overall English knowledge that L2 English learners have. This finding also seems to be consistent with Cook's (1994, 1998) interpretation of L2 learning within this generative framework – "L2 learners need to spend comparatively little effort on core grammatical structure covered by UG principles", while "they need to acquire an immense amount of detail about how individual words are used in grammatical structures" (p. 43).

Finally, as noted earlier, Korean has typological differences from English with respect to the relative position of verbs and other elements (Kim, 1987). Korean has word orders such as Object + Verb, Adverb + Verb, Verb + Negative, Verb + Auxiliary Verb and so on, while English tends to show the opposite word orders such as Verb + Object, Verb + Adverb, Negative + Verb, and Auxiliary Verb + Verb (Heine, 1975). These typological differences between Korean and English also indicate the differences in the syntactic property of verbs between the two languages. Thus, Korean learners' lexical knowledge about the relative position of English verbs and other elements as well as the argument structures of English verbs might play a crucial role in their acquisition of grammatical knowledge. This also implies that the syntactic property of lexical knowledge might be more important when learners' L1 is typologically different from their target language than when their L1 and L2 are typologically similar. Thus, if Korean learners acquire L2 Japanese, it is expected that the syntactic property of L2 Japanese verbs might not be as important in the acquisition of L2 grammatical knowledge as that of L2 English verbs, since Koran and Japanese are typologically

similar with respect to the relative position of verbs and other elements. Consequently, when L1 and L2 are typologically similar, the relative importance of each L2 lexical property in the acquisition of L2 grammatical knowledge might be different from the findings from the current study.

4.2.2.3. Morphological Property of In-Depth Lexical Knowledge

When it comes to the morphological section of the depth of vocabulary knowledge test, the question still remains unresolved as to why the morphological property of lexical knowledge did not contribute as much to the prediction of grammatical development as the syntactic property, if we considered that grammatical knowledge, in general, is defined as containing morphological and syntactic knowledge. Importantly, given the recent model of generative syntax (Chomksy, 1995), the morphological feature of a given word is claimed to be a major factor determining cross-linguistic syntactic variations like word order, although these morphological features should be understood as abstract features like ± tense/finite, ±past, and person or number (its overt morphology in English is realized as *–s*, *-ed*, or *–Ø*.) (Adger, 2003; White, 2003b, p.180). Furthermore, the fact that the semantic property of lexical knowledge was a better indicator of grammatical knowledge than the morphological one might make the interpretation of the results more complicated.

There might be several possible accounts of this disadvantage of the morphological over semantic properties in the prediction of grammatical knowledge.

First, argument structures as syntactic properties of individual English verbs are, in fact, 'semantically' or 'conceptually' determined (Haegeman, 1991; Cook & Newson, 1996). For instance, if L2 learners know the meaning of the verb *love,* they also know how many participants are involved and which argument role should appear in the subject or object position. For the verb *eat,* the person who initiates the action expressed by *eat* and the person who undergoes the action expressed by *eat* are required in the subject and object position, respectively, to produce a grammatical sentence, as shown in *Hailey eats an apple*. This might imply that the semantic property of a given word might be at least indirectly associated with syntactic features of the word. This speculation about the relationships between semantic and syntactic properties of a given word was partly verified by the result that the semantic section was more correlated with the syntactic section than the morphological section (r=.390 vs. r=.228). As a result, the fact that semantic knowledge partly entails syntax-related knowledge like argument structures might provide a partial answer to why the semantic section was a better predictor for L2 learners' overall grammatical knowledge than the morphological section.

Another explanation might be that the morphological section of the vocabulary test might fail to measure the participants' morphological knowledge accurately. The morphological section focused on both inflectional and derivational knowledge of a given verb. The inflectional knowledge of a given verb assessed by this morphology test might seem to be very simple and straightforward. Thus, it was, in fact, limited to a few grammatical morphemes *–s*, *-ed*, or *-ing* that English verbs can have, except for two

irregular verbs such as *hurt* and *send*. As also found in Schmitt and Meara's (1997) study on the acquisition of English verbal suffixes by Japanese EFL learners, these inflectional suffixes seem to be relatively easier to master, especially in their receptive use, than derivational suffixes. Specifically, since the addition of suffixes like 3rd person singular *–s* or past tense *-ed* should be determined by the relation to other elements in the sentence (Adger, 2003), as in *Jaeyoon ***love*** me vs. Jaeyoon ***loves*** me, the test format, in which the alternatives were given without any example sentences, might not be appropriate for assessing L2 learners' inflectional knowledge accurately. Therefore, it seems that the inflectional knowledge assessed by this morphological section may not be used as a criterion for discriminating the different degrees of L2 learners' inflectional knowledge. In other words, the degrees of inflectional knowledge might not be varied enough to be related to learners' overall grammatical knowledge, since almost every participant did not have any problems recognizing a correctly inflected form from the alternatives that were presented without contexts (e.g. *sended* vs. *sent*).

With regard to derivational knowledge, L2 learners' knowledge about possible derivational affixes is also linked to syntactic knowledge about not only the category (or parts of speech) of words, as in *believe* (verb) → *believable* (adjective) but also the characteristic of their subcategorization frames (Ouhalla, 1994, p. 42), as seen in *Mary translated the book* vs. *The translation (of the book) was awful*. That is, the addition of the affix *-able* changes the category of the verb *believe* into an adjective, and the derivation of

the noun *translation* from the verb *translate* makes the derivative have a different subcategorization frame from that of the stem. However, the derivational features of a given English verb assessed by the morphological test might not be as closely associated with overall grammatical knowledge as the syntactic property of the word might, since the derivational knowledge measured by this vocabulary test might be confined to the lexical knowledge about the parts of speech such as verbs, noun, adjectives etc. That is, it seems that the morphological section of the vocabulary test fails to elicit L2 learners' lexical knowledge about the subcategorization frames of the derivatives, which might be more connected to sentence structures.

Additionally, there have been many generative-based studies on morphology and the representation of inflectional and derivational affixes in the lexicon (Halle & Marantz, 1993, 1994; Embick, 1995; Embick & Noyer, 2001). Specifically, a linguistic theory known as Distributed Morphology claims that "morphology interprets the output of the syntactic derivation" (Embick & Noyer, 2001, p. 557), and that "syntactic structures might be generated by combining morphosyntactic features (via Move and Merge) selected from the inventory available" (Harley and Noyer, 1999, p. 3). Thus, this morphology theory is considered as one possible model for the explanation of the relationship between lexical and grammatical knowledge in L2 acquisition. However, since the morphological test used in this study was not designed based on this generative-based morphology study, the extent to which this test measured the morphological features connected to grammatical knowledge might be unclear. This

means that with more focus on items with varied morphological properties, the results might be different from the findings from the current study.

Finally, according to an L2 lexical development model proposed by Jiang (2000), it was claimed that the morphological information of lexical knowledge might be more difficult to master than the semantic information, which is directly associated with the syntactic information of lexical knowledge. Thus, despite the possibility that the morphological section of the vocabulary test might be as highly correlated with overall grammatical knowledge as the syntactic section of the test, this late development of morphological knowledge might prevent morphological knowledge from being positively related to overall grammatical knowledge. This late development of morphological knowledge might be consistent with the finding that "morphology relating to tense, agreement, number, case, gender, etc., ….. are sometimes present and sometimes absent in spontaneous production data" (White 2003, p. 178). Particularly, as discussed in Hawkins & Liszka (2003), even advanced L2 English learners continue to show some problems with using simple past tense marker *–ed* in their spontaneous oral production.

In sum, we still need to do further research to find out a plausible answer for this disadvantage of the morphological property of vocabulary knowledge in predicting learners' grammatical knowledge. At this point, however, these three possible answers just discussed should be understood as providing complementary accounts of the finding about the relatively weak role of the morphological property of lexical

knowledge in the prediction of grammatical knowledge.

4.3. Summary and Conclusion

In this chapter, the results from the current study have been presented, and main findings have been discussed based on the two theoretical frameworks adopted for this study – L2 research into depth of vocabulary knowledge and a generative approach to syntax. The major findings from the current study are as follow:

A. There was a high positive correlation between lexical and grammatical knowledge in the L2 acquisition of English by Korean EFL learners (r= .815, $p < .01$).

B. Three properties of lexical knowledge – semantic, morphological, and syntactic – all were found to make significant contributions to the prediction of L2 learners' overall grammatical knowledge.

C. The syntactic property of lexical knowledge was found to contribute more to predicting L2 learners' overall knowledge of grammar than any other two properties: ***syntactic property > semantic property ≈ morphological property.*** Specifically, contrary to the theoretical consideration, it was found that the morphological property of English verbs was not as important in the prediction of L2 grammatical knowledge as their syntactic property.

Based on these findings, two major points were discussed in relation to depth of lexical knowledge and generative syntactic theory. First, it was argued that the introduction of

the construct, *depth of lexical knowledge,* might make it possible to provide a more plausible explanation of the relationship between lexical and grammatical knowledge, than when a breadth-based view on L2 lexical knowledge is adopted.

On the other hand, a generative approach to syntax also seems to provide a theoretical background of how each property of depth of lexical knowledge would be related to overall grammatical knowledge. Thus, this generative approach to syntax has placed an emphasis on the role of lexical properties in deriving basic sentence structures. Specifically, it was argued that the notion of argument structures or subcategorization incorporated in this generative syntax might function as important lexical properties that might connect vocabulary knowledge with grammatical knowledge.

Finally, some possible explanations for the disadvantage of the morphological features of lexical knowledge in the prediction of L2 English grammatical knowledge were explored on the basis of the notion of argument structures, the characteristics of morphological knowledge assessed by the in-depth vocabulary test, and L2 lexical development model proposed by Jiang (2000).

CHAPTER FIVE: CONCLUSION

5.1. Limitations of the Study and Recommendations for Further Research

There are some limitations of the current study, and these limitations can also be considered as suggestions for relevant future research. First, this study was primarily concerned with only receptive aspects of L2 vocabulary and grammatical knowledge. Thus, the two tests used in this study were designed on the basis of a recognition-type test like a multiple-choice format. However, there seem to be clear differences between receptive and productive knowledge in their use and learning (Schmitt & Meara, 1997; Nation, 2000; Mondria & Wiersma, 2004). Thus, the participants' lexical and grammatical knowledge of L2 English measured by the two tests might not fully reflect their knowledge of English vocabulary and grammar, since what it means to have lexical and grammatical knowledge should be understood within the receptive and productive continuum. In order to obtain a more accurate idea of how depth of word knowledge might be related to the construction of L2 grammar, we also need to investigate the productive aspect of vocabulary and grammar through the comparison between learners' productive vocabulary use and their written or spoken L2 data.

Second, the current study did not focus on breadth of lexical knowledge, i.e. vocabulary size, which has been regarded as another view on which L2 lexical knowledge is examined. However, as pointed out by Schmitt and Meara (1997), if we consider that there is a relatively high correlation between vocabulary size and depth of

vocabulary knowledge, we also need to examine how L2 vocabulary size would be related to L2 grammatical development. That is, both approaches to L2 lexical knowledge must be taken into consideration to better understand the relationships between lexical and grammatical knowledge in L2 acquisition. Additionally, by comparing the extent to which depth and breadth of vocabulary knowledge contribute to the explanation of variance in L2 learners' overall proficiency level, we also need to draw a conclusion about which perspective on L2 lexical knowledge will be more important in L2 acquisition.

Third, the in-depth vocabulary test designed specially for the current study did not include other properties of lexical knowledge such as collocation, pragmatic, or discourse characteristics for both theoretical and practical reasons. From a theoretical perspective, we do not yet have any clear ideas of how to measure the pragmatic or discourse features of lexical knowledge, or how to operationalize the constructs for the testing process. From a practical point of view, on the other hand, if we are to include all of the properties of lexical knowledge in one test format, the number of items for the comprehensive in-depth vocabulary test might be too large to be administered in one session. Nevertheless, despite these theoretical and practical problems, we will ultimately need to create more comprehensive in-depth vocabulary test which can also measure other properties of vocabulary knowledge to better understand the relationships between depth of lexical knowledge and grammatical knowledge.

Fourth, the stimulus words for the in-depth vocabulary test were limited to

English verbs. Since verbs are generally considered to be the main element determining the sentence structure, English verbs were chosen as a starting point for exploring the relationships between lexical and grammatical knowledge. However, to obtain comprehensive understanding of how the depth of vocabulary knowledge about different parts of speech would be associated with grammatical knowledge in L2 acquisition, we need to conduct further research focusing on other parts of speech such as adjectives, preposition, and nouns.

Fifth, since this study was based on a correlational research design, the result can be used only for exploring cause-effect relationships between lexical and grammatical knowledge, which means that a strong conclusion about the causality cannot be drawn from the result alone. However, since theoretical considerations for the current study have also provided an implication about the important role of lexical knowledge in L2 grammar construction or the influence of lexical knowledge on grammatical knowledge, we need to carry out further experimental research to test the causality implied from this study -- lexical knowledge might influence grammatical knowledge, for instance, by giving different teaching methods to the experiment and the control groups with respect to L2 vocabulary learning – L2 vocabulary-focused teaching vs. no L2 vocabulary teaching. In addition, we also need to conduct the experimental research on the role of vocabulary in L2 grammatical development, in that L2 proficiency tests tends to be correlated with one another. That is, the strong correlation obtained from the vocabulary and grammar tests might reflect this tendency of L2 proficiency tests. In

this regard, Arnaud (1989) also pointed out that grammar and vocabulary tests tend to be strongly correlated with each other.

Finally, the findings from the current study should be limited to the L2 acquisition of English by Korean adult EFL learners. Since the strong correlation between lexical and grammatical knowledge obtained from the current study was, in fact, based on the typologically different L1 and L2, the L2 English acquisition by other groups whose L1 is typologically similar to English might show different results.

5.2. Pedagogical Implications

To explore possible ways to apply the findings from the current study to L2 teaching, we first need to reconsider the major findings drawn from the results of the two tests. First, it was found that Korean EFL learners' depth of lexical knowledge and their grammatical knowledge were closely correlated with each other, even though we cannot draw a strong conclusion about the causality relationship between depth of lexical knowledge and grammatical knowledge. However, given the fact that, even for the high-frequency words that are known by many L2 learners, the participants showed different degrees of lexical knowledge, it might be suggested that multiple properties of lexical knowledge including morphological and syntactic features of L2 words should be emphasized in L2 teaching.

Second, English course books might not need to have separate sections on vocabulary and grammar. Thus, if we consider the findings about the relationship

between depth of lexical knowledge and grammatical knowledge, it might be possible that English grammatical structures are covered in the vocabulary section by emphasizing the various properties of given English words. As Hunston et al. (1997) pointed out, "traditionally, language courses were organized around a set of grammatical points, with vocabulary selected to support the topic of each course unit" (p. 208). However, the strong correlation between lexical and grammatical knowledge also suggest that language courses should be organized around vocabulary, with more focus on the syntactic property of vocabulary items.

Third, the result from multiple regression analysis of each section of the vocabulary test on grammatical knowledge indicated that semantic, morphological, and syntactic sections all made significant contributions to explaining the variance in grammatical knowledge. This result implies that language teachers might be able to rely on learners' lexical knowledge about semantic, morphological, and syntactic properties of English verbs in order to diagnose their levels of English grammatical knowledge or to predict their overall English knowledge. In particular, since this study showed that even high-frequency words (2000-word level), which are expected to be known by many learners in terms of their meanings, can be used as the diagnostic words for measuring overall grammatical knowledge, language teachers might be able to identify learners who have strong grammatical knowledge or weak grammatical knowledge through using easy words.

Finally, with regard to the use of an English dictionary by L2 learners, teachers

need to make students aware of not only word meanings but also related words and syntactic constraints that individual words have. As mentioned above, although this study cannot overtly reveal the causal relationship between vocabulary and grammar, the fact that there was a high correlation between vocabulary and grammatical knowledge might implicitly suggest that L2 English learners should pay attention to morphological and syntactic properties of individual words as well as their semantic one, when they look up unknown words in an English dictionary.

5.3. Conclusion

The current study was inspired by a suspicion of the widely held belief that vocabulary and grammar are totally distinct components that should be acquired separately. Accurately speaking, although we have taken it for granted that vocabulary and grammar are indispensable elements in L2 learning, the interdependent nature of the two elements has never been seriously considered by language learners or even language teachers. This negligence of this issue also seems to be overtly evident in the fact that it is difficult to find relevant empirical research (Richard, 1976; Zimmermann, 1997).

However, generative syntactic theory and L2 research into depth of lexical knowledge have offered a theoretical background of the interdependency of lexical and grammatical knowledge in L2 acquisition. First, L2 vocabulary researchers have claimed that depth of lexical knowledge can be represented by multiple properties of

lexical knowledge (Qian, 1999; Read, 2004) and the multiple properties of vocabulary knowledge should be seen as consisting of written/oral forms, word meanings, morphological features, syntactic constraints, and pragmatic/discourse features (Richards, 1976; Nation, 1990, 2001). Thus, this L2 vocabulary research has suggested some connections between depth of L2 lexical knowledge and L2 grammatical knowledge, since the morphological and syntactic properties of lexical knowledge might be possible candidates which can contribute to L2 grammatical development. Second, Chomskian generative syntax has claimed that the lexical properties of individual words might play a significant role in constructing grammatical structures. Specifically, the notion of argument structure or subcategorization frames adopted in this generative syntax might show how the idiosyncratic lexical properties of individual words can be tied to the construction of sentence structures. The recent generative model also claims that the lexicon should be the starting point for syntactic derivation by minimizing the syntactic component in language grammar and maximizing the role of individual lexical properties in syntactic construction.

Despite these theoretical considerations of the interdependent nature of grammar and vocabulary in L2 development, it is also the case that there have been few empirical studies on this issue. So, the main concern of the current study was to investigate the relationships between lexical and grammatical knowledge in L2 acquisition. Data were collected from Korean adult EFL learners through the in-depth vocabulary test which was focused on semantic, morphological, and syntactic properties of English verbs and

the grammar test which was geared toward measuring 'pure' grammatical knowledge.

The test results showed that there was a high positive correlation between lexical and grammatical knowledge in the L2 acquisition of English by Korean EFL learners, and that semantic, morphological, and syntactic properties of lexical knowledge all contributed to the prediction of L2 English learners' overall grammatical knowledge. In particular, the syntactic property of lexical knowledge was found to contribute most to predicting L2 learners' knowledge of grammar. However, the morphological property was found to be less important in the prediction of L2 grammatical knowledge than the syntactic property.

Based on these findings, it was argued that the in-depth view on L2 lexical knowledge might be appropriate for explaining the interdependent nature of lexical and grammatical knowledge, since this in-depth perspective sees lexical knowledge as consisting of various properties such as semantic, morphological, and syntactic features. On the other hand, a generative view on syntax also seems to provide an account of how each property of lexical knowledge would be related to overall grammatical knowledge. Thus, the syntactic property of word knowledge such as argument structures and subcategorization frames might serve as a connector which links lexical and grammatical knowledge.

Finally, some possible accounts of why the morphological property of vocabulary knowledge did not contribute as much to the prediction of L2 grammatical knowledge as the syntactic property were provided on the basis of the notion of argument

structures, the characteristics of morphological knowledge assessed by the in-depth vocabulary test, and L2 lexical development model proposed by Jiang (2000).

APPENDIX A: CONSENT FORM

Title: **Lexical and Grammatical Development in the Acquisition of English by Korean EFL Learners**

Conducted by: **Chang Won Shin**
(supervised by Dr. Elaine K. Horwitz and Dr. Lisa J. Green)

Of The University of Texas at Austin: *Department / Office*: **Foreign Language Education**
Telephone: **(512) 477-7636**

Dr. Elaine K. Horwitz: Foreign Language Education at the University of Texas at Austin
Telephone: (512) 232 - 4108
Dr. Lisa J. Green: Department of Linguistics at the University of Massachusetts at Amherst Telephone: (413) 577 - 0937

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time and your refusal will not impact current or future relationships with UT Austin or participating sites. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

The purpose of this study is to investigate the relationships between lexical and grammatical development in L2 acquisition of English by Korean EFL learners by examining how the depth of lexical knowledge that Korean learners have about English verbs is associated with their grammatical development, based on recent L2 research into the depth of lexical knowledge and the implications from a recent syntactic theory. 100 college students who are taking a first-year English course at your university will participate in this study.

If you agree to be in this study, we will ask you to do the following things:

• If you participate in this research, you will be asked to fill out a preliminary questionnaire about your *age, major, exposure time to English or usage time of English*, and *any particular English words (or parts of speech) and structures each subject has difficulties in producing and comprehending.*

• Then you will be asked to take two written tests – vocabulary and grammar tests.
• The vocabulary test consists of three parts, and each part has 20 questions (the total number of questions is 60). In the first part, the meaning of given verbs will be asked by having you write L1 equivalents of the stimulus verbs. The second part will cover the morphological features of the same verbs used in the first part by asking you to select three correct inflected or derived forms of given stimulus verbs from four alternatives. In the third part, the syntactic aspects of a given word will be assessed by having you choose three sentences including correct argument structures (or possible structures) from four example sentences.
• The grammar test is made up of 50 questions aimed to measure English learners' overall grammatical knowledge for both written and spoken language proficiency by asking you to select one correct or incorrect expression from four alternatives.
• The total amount of time needed for these two tests will be approximately 60 minutes (Vocabulary Test- 30 min. / Grammar Test - 30 min.).

Total estimated time to participate in study is one-hour

Risks of being in the study

Since this study will be dealing with the relationships between lexical and grammatical development in the acquisition of L2 English by Korean EFL learners by having you take two language tests about vocabulary and grammar, the risk associated with this study is no greater than everyday life. In other words, this study is not expected to cause you any physical and mental risks while you are participating in this study. However, there may be risks or discomforts that are unknown at this time. If you wish to discuss the information above or any other risks you may experience, you may ask questions now or call the Principal Investigator listed on the front page of this form.

Benefits of being in the study

Since this study is primarily concerned with the relationships between in-depth lexical knowledge and grammatical knowledge in the acquisition of L2 English, it is expected that you might gain some benefits like awareness of the importance of in-depth vocabulary knowledge. Additionally, after this study is completed, the result may be beneficial to teaching and learning English grammar and vocabulary, in particular, by showing the role of in-depth lexical knowledge in the prediction of English learners' grammatical development.

Compensation:

You will not receive any compensation for your participation. All the participants

will take part in this study on a voluntary basis.

Confidentiality and Privacy Protections:

• In order to maintain the confidentiality of the research data and protect your privacy, you will be asked not to write your name or initial on your answer sheet, and I will store the answer sheet in a secure place during this research and limit access to the data to the researchers including me and my supervisors.

• Also you will not have to answer every question, if you think it may threaten you privacy, or you do not want to reveal some information concerning a particular question.

• The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

• The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and (study sponsors, if any) have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

Contacts and Questions:

If you have any questions about the study please ask now. If you have questions later, want additional information, or wish to withdraw your participation call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of this page. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Jody Jensen, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects at (512) 232-2685 or the Office of Research Support and Compliance at (512) 471-8871 or email: orsc@uts.cc.utexas.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information and have sufficient information to make a decision about participating in this study. I consent to participate in the study.

Signature:_____ Date: _____

_____ Date: _____
Signature of Person Obtaining Consent

Signature of Investigator:_____ Date: _____

APPENDIX B: 동 의 서

연 구 제 목: 한국인 영어학습자의 영어 어휘 및 문법 발달

연 구 자: 신창원 (지도교수: Dr. Elaine K. Horwitz / Dr. Lisa J. Green)

소 속: 텍사스 주립대 (오스틴 소재) / 외국어 교육학과
(전화: 1-512-477-7636)
- **Dr. Elaine K. Horwitz:** 텍사스 주립대 외국어 교육학과 (전화: 1-512- 232-4108)
- **Dr. Lisa J. Green:** 메사추세츠 주립대 언어학과 (전화: 1-413-577-0937)

여러분이 참여여부를 결정할 수 있도록 이 문서는 위 연구에 관한 정보를 제공할 것입니다. 연구자가 여러분께 연구에 관해 설명하고 여러분의 질문에 답변할 것입니다. 밑에 주어진 관련 정보를 읽고 참여 여부를 결정하기 전에 어떠한 질문도 하실수 있습니다. 여러분의 참여는 전적으로 자발적이며 어떤 불이익없이 참여를 거부할 수 있습니다. 언제든 참여를 그만둘 수 있으며 그러한 참여 거부가 현재 혹은 미래의 학교 생활 혹은 수업에 어떤 영향도 미치지 않을 것입니다. 참여를 그만두고 싶은 경우에는 위 연구자에게 알려주시기 바랍니다. 또한 연구자는 당신이 보관할 수 있도록 이 동의서의 복사본을 줄 것입니다.

본 연구의 목적은 한국인 영어학습자가 갖고 있는 영어 동사에 관한 심층적 어휘지식이 문법지식과 어떤 관련이 있는지를 조사함으로써 영어 어휘 및 문법 발달의 관계를 연구하는 것입니다. 이 연구는 심층적 어휘 지식에 관한 최근 연구와 통사론 이론에 바탕을 두고 있으며 여러분이 재학중인 대학에서 1학년 교양영어를 수강하는 100명의 학생이 참여할 예정입니다.

여러분이 본 연구에 참여하게 되면 다음과 같은 것을 하게 될 것입니다

- 먼저 여러분의 나이, 전공, 영어를 사용하는 시간, 영어를 사용하고 이해하는데 어렵게 느끼는 어휘 및 문법 분야에 관한 설문을 작성하게 됩니다.

- 그 다음 어휘와 문법에 관한 테스트를 보게 됩니다.

- 영어어휘 테스트는 세 부분으로 되어 있으며 각 부분은 20문제로 모두 60문제가 주어집니다. 첫번째는 주어진 영어동사의 의미를 물어보기 위한 부분이며 이를 위해 여러분은 우리말로 각 동사의 뜻을 쓰게 되며 두번째 부분에서는 동사의 형태론적 특징을 묻기 위해서 4개의 파생형 또는 굴절형 중에서 3개의 옳은 형태를 고르게 됩니다. 마지막으로 세번째 부분에서는 각 동사의 문법적인 지식을 물어보기 위해서 4개의 예문중에서 해당동사가 취할수 있는 목적어 및 전치사를 사용한 문장 3개를 고르게 됩니다.

- 문법 테스트는 50문제로 되어 있으며 4지 선다형 형태로 문어/구어 영어사용을 위

한 전반적인 영어 문법지식을 측정하게 됩니다.

- 테스트 시간은 대략 60분 정도 소요됩니다.(어휘테스트 30분 / 문법테스트 30분)

본 연구의 참여를 위한 예상 소요 시간은 1시간 정도 입니다.

본 연구에서 예상되는 위험

본 연구는 두개의 영어관련 테스트-어휘 및 문법-를 바탕으로 한국인 영어학습자의 영어 습득에서 문법과 심층적 어휘지식의 관련성을 다루고 있기 때문에 본 연구와 연관된 피험자의 물리적 정신적 위험은 거의 없는 것으로 예상됩니다. 하지만 현재는 알려지지 않은 위험요소가 있을지 모릅니다. 만약 위에 주어진 정보나 여러분이 경험할지 모르는 다른 위험요소에 관해 논의하길 원한다면 지금 질문을 하거나 혹은 나중에 본 동의서 첫장에서 주어진 연구자에게 연락을 주시기 바랍니다.

본 연구를 통해 예상되는 이득

본 연구는 영어 습득에서 보여지는 문법지식 및 심층적 어휘지식의 관련성에 중점을 두고 있기 때문에 외국어 학습에서 심층적 어휘지식의 중요성을 여러분께 인식시킬 수 있을 것으로 예상됩니다. 또한 본 연구의 결과는 영어 학습자의 심층적 어휘 지식이 그들의 문법지식을 예측하는데 어떤 역할을 하는지 보여줌으로써 영어문법 및 어휘 학습 및 교육에 도움이 될 것으로 예상됩니다.

보상

본 연구의 참여에 대해서 어떠한 대가도 주어지지 않을 것이며 모든 피험자는 자발적으로 본 연구에 참여하게 됩니다.

자료의 보안과 피험자의 프라이버시 보장

- 연구자료의 보안을 유지하고 여러분의 프라이버시를 보장하기 위해서 다음과 같은 조치가 취해질 것 입니다. 테스트 용지에 이름이나 이니셜을 쓸 필요가 없으며 본 연구가 진행되는 동안 테스트 용지는 안전한 곳에 보관될 것이며 자료에 대한 접근은 연구자인 본인(신창원)과 지도교수에게만 제한될 것입니다.

- 만약 여러분의 프라이버시에 침해를 느끼거나 특정 문제에 대한 정보를 제공하길 원하지 않는다면, 그 질문에 대해서 답변하지 않으셔도 됩니다.

- 여러분의 참여로 얻어진 자료는 현재 여기서는 분명히 밝혀지지 않은 미래의 연구를 위해 다른 연구자에 의해 다시 사용될수 있습니다. 그러한 경우에도 여러분를

인지할수 있는 어떠한 단서나 정보도 주어지지 않을 것입니다.

- 본 연구와 관련된 기록은 안전한 곳에 보관될 것이며 비밀이 유지될 것입니다. 텍사스 대학으로 부터 인가를 받은 사람과 본대학내 연구의 타당성과 피험자의 권익을 보호하는 위원회는 여러분과 관련된 연구 기록을 검토할 수 있는 법적 권리를 가지며 법이 허용하는 범위내에서 최대한 피험자의 비밀을 유지할 것입니다. 본 연구와 관련된 모든 출판물은 여러분을 알 수 있는 어떠한 정보도 포함하지 않을 것이며 여러분이 계속해서 연구에 참여할지에 영향을 미칠만한 새로운 정보가 있으면 연구가 진행되는 동안 계속해서 알려드릴 것 입니다.

연락정보

본 연구에 관해 질문이 있다면 지금 해 주시고 나중에라도 질문이 생기거나 추가 정보를 원하거나 참여를 그만 두길 원한다면 연구자에게 연락주시기 바랍니다. 이름과 전화번호 이메일 주소는 본 문서 첫장에 있습니다. 만약 연구 피험자로서의 여러분의 권리와 불만 그리고 연구에 관한 질문이 있다면 텍사스 주립대 피험자보호를 위한 위원회의 책임자인 조디 젠센 박사 (Dr. Jody Jensen) (전화번호: 1-512-232-2685) 나 본 대학 연구지원과로 연락주시기 바랍니다 (전화번호: 1- 512- 471-8871 혹은 orsc@uts.cc.utexaa.edu)

여러분이 보관할수 있도록 본 동의서의 복사본이 주어질 것입니다.

동 의 서

본인은 위에 주어진 정보를 모두 읽었으며 참여 여부를 결정할 수 있는 충분한 정보를 얻게 되었습니다. 본인은 위 연구에 참여할 것을 동의합니다.

피험자 서명 : _____ **날짜**_____

_____ **날짜**_____
동의를 얻은 사람의 서명

연구자 서명 :_____ **날짜** _____

APPENDIX C: BACKGROUND QUESTIONNAIRE

1. Age: _____ 2. Gender: Male _____ Female _____

3. Major _____ Years _____

4. Did you start to learn English before receiving formal English education?
   Yes____ No _____ If so, at what age? _____

5. Did you ever study abroad to learn English? Yes ___ No ____
   If so, In what country? _____ How long? _____

6. After entering college, have you ever taken English courses at a private language institute, or are you taking English courses now? Yes__ No__
   If so, how long? _____ Course _____

7. Did you ever taken English proficiency tests such as TOEFL, TOEIC, or TEPS?
   Yes ____ No _____ If so, what kind of test? _____
   If you want to reveal your score, the total score is _____
   (Listening _____ Reading _____ Writing _____ Speaking _____
   Grammar _____ Vocabulary _____)

8. Your average exposure time to English or usage time of English per day: _____ hour(s) _____ minute(s)

9. Which parts of English grammar do you feel difficulties in learning or using? (*e.g.* preposition, relative pronoun, or article)
   _____

10. Which parts of English vocabulary do you feel difficulties in learning or using?(*e.g.* meaning, pronunciation, synonym, antonym, which word should be used with a given word?, or does a given verb take *to*-infinitive or gerund?)
    _____

APPENDIX D: IN-DEPTH VOCABULARY TEST

This test is designed to measure your in-depth lexical knowledge (Testing time: 30 minutes).

Part I: Please write down the meaning of each verb in Korean.

1. accept _____
2. allow _____
3. associate (verb)_____
4. believe _____
5. check (verb)_____
6. conduct (verb)_____
7. destroy_____
8. drive _____
9. examine _____
10. fill _____
11.hurt(verb)_____
12. investigate_____
13. learn _____
14. mark (verb) _____
15. note (verb) _____
16. persuade _____
17. protect _____
18. recognize _____
19. remind _____
20. send _____

Part II: For each verb, please choose one incorrect related form**.**

1. accept

(a) acceptance (b) acceptable (c) accepted (d) acceptuous

2. allow

(a) allowance (b) allowing (c) allower (d) allowed

3. assoicate (verb)

(a) association (b) associated (c) inassociate (d) disassociated

4. believe
(a) believal (b) belief (c) disbelief (d) believable

5. check (verb)
(a) checked (b) checkish (c) checking (d) checkable

6. conduct (verb)
(a) conductor (b) conducted (c) conduction (d) conductable

7. destroy
(a) destruction (b) destructive (c) destroyal (d) destroyer

8. drive
(a) drove (b) droven (c) driven (d) driving

9. examine
(a) examinate (b) examination (c) examinee (d) examiner

10. fill
(a) filler (b) fillure (c) filled (d) fills

11. hurt
(a) hurt **(past form)** (b) hurtful (c) hurtive (d) unhurt

12. investigate
(a) investigation (b) investigater (c) investigated (d) investigative

13. learn
(a) learned (b) learnedness (c) learnning (d) learner

14. mark
(a) markage (b) marking (c) marker (d) markedly

15. note
(a) noted (b) notable (c) notes (d) notible

16. persuade
(a) persuative (b) persuasion (c) persuasiveness (d) persuasive

17. protect
(a) protecive (b) protection (c) protectionism (d) protectious

18. recognize

(a) recognition (b) recognization (c) recognizable (d) recognized

19. remind

(a) reminder (b) reminded (c) remindful (d) remindance

20. send

(a) sended (b) sender (c) sending (d) sent

Part III: For each verb **p**lease select **<u>one incorrect sentence</u>** (For this question, you might need to pay attention to which objects or prepositions should be used with each verb)

1. accept

(a) Our clients will never accept this proposal.

(b) Most scientists accept that climate change is linked to carbon emissions.

***carbon emission: 탄소 배출**

(c) Mexico was accepted a member of the OECD in 1994.

(d) His views on genetics are not now widely accepted.

***genetics: 유전학**

2. allow

(a) A VCR allows you recording programs and watching them later.

(b) She only allows the children to watch television on the weekends.

(c) Some prisoners are allowed visitors.

(d) I'm sorry, sir, but smoking is not allowed.

3. assoicate

(a) The study found that many people associate science with masculinity.

***masculinity: 남성다움**

(b) His social problems associated with heavy drinking.

(c) I haven't been associated with the project over the last year.

(d) Through science we've got the idea of associating progress with the future.

4. believe

(a) I don't believe that she' s ever been to Hong Kong.

(b) I don't believe in ghosts.

(c) It is widely believed that the virus originally came from monkeys.

(d) A third man believes to have been taken into police custody.

5. check
(a) I checked the car with signs of damage.
(b) The doctor checked for a pulse.
(c) He checked the contents of the package carefully.
(d) Could you please check whether a package has arrived for me?

6. conduct
(a) Gonzalez has conducted an impressive electoral campaign.
***electoral campaign:** 선거운동
(b) He has conducted himself with dignity.
(c) Water conducts with heat faster than with air.
(d) The orchestra is conducted by John Williams.

7. destroy
(a) An earthquake destroyed the town, killing about 20,000 people.
(b) No one was injured in the explosion, but the building was completely destroyed.
(c) This action destroyed any remaining hope of reaching an agreement.
(d) The dog attacked a child and had to destroy.

8. drive
(a) Desperation finally drove her ask for help.
(b) We usually drive to Florida, but this year we're flying.
(c) Lee drove me to the airport.
(d) The rising flood waters had driven her out of the village.

9. examine
(a) She opened the suitcase and examined into the contents.
(b) I think you should be examined by a doctor.
(c) Candidates will be examined on their written and oral language skills.
(d) Scientists are examining the impact of global warming on local climates.

10. fill
(a) The air was filled with the scent of roses.
(b) Crowds of spectators are expected to fill with the streets tonight.
(c) She filled the bowl with warm water.
(d) Tears filled her eyes.

11. hurt
(a) I never meant to hurt your feelings.
(b) You're hurting on my arm.
(c) His cold behavior hurt her deeply.
(d) His collar bone only hurt when he lifted his arm.
***collar bone: 쇄골**

12. investigate
(a) Police are still investigating about how the accident happened.
(b) The research aims to investigate why schools are not doing better.
(c) All complaints from our customers are investigated quickly and efficiently.
(d) We sent a reporter to investigate the rumor.

13. learn
(a) Their children were going to learn English.
(b) The children are learning to swim this summer.
(c) I want to learn how to dive.
(d) We didn't learn the situation until it was too late.

14. mark
(a) Her cheek was marked with scratches.
(b) Shiny wooden surfaces tend to mark very easily.
(c) His job is to mark lines with roads.
(d) Anyone who is late will be marked absent.

15. note
(a) Please note that all passengers must have a valid passport.
(b) Liz noted the changes with satisfaction.
(c) It is interesting to note that government money was used to fund their operations.
(d) The area is noted with its vineyards.

16. persuade
(a) Nobody could persuade her to change her mind.
(b) There was no way she could persuade him her innocence.
(c) I managed to persuade him that it was not his fault.
(d) Their argument failed to persuade me.

17. protect
(a) Databases are generally protected by copyright.
(b) The hat only partially protected his face from the sun.
(c) This warm jacket will help to protect you for the cold.
(d) Are you prepared to protect yourself in case of attack?

18. recognize
(a) I thought I recognized her voice!
(b) We recognize that there are some problems with the current system.
(c) He is recognized the new champion.
(d) The importance of Herschel's contribution is generally recognized.

19. remind
(a) She reminded me that we had in fact met before, at a conference in Washington.
(b) That song always reminds me with our vacation in Mexico.
(c) Remind Jenny to bring her laptop when she comes.
(d) Can you remind us of your plans for the building?

20. send
(a) Mary sent a book to John.
(b) Mary sent John a book.
(c) Mary sent a book to France.
(d) Mary sent France a book.

APPENDIX E: GRAMMAR TEST

This test is designed to measure your overall grammatical knowledge.
(Testing Time: 30 minutes)

Please choose the most appropriate expression in the blank

1. A: How's John feeling these days?
   B: He got _____ after he stopped taking his medication.
   (a) worse (b) the worse (c) more worse (d) the worst

2. A: Hi, Mom. Sorry I'm late for dinner.
   B: Jerry, you should know by now, _____ on time is very important.
   (a) be (b) being (c) been (d) having been

3. A: If we start early, we should be finished before six.
   B: Yes. Let's just get this _____ today.
   (a) over with (b) to over with (c) over it (d) to over it

4. A: _____ my birthday?
   B: Your brother told me.
   (a) How was it you did know (b) How you did know it was
   (c) How did you know it was (d) How did you know was it

5. A: I canceled my doctor's appointment.
   B: You _____ that.
   (a) shouldn't have done (b) could have done
   (c) should do (d) couldn't do

6. A: I called the number you gave me but _____ person answered.
   B: Really? I'm sorry. I'll check the number again.
   (a) wrong (b) the wrong (c) any wrong (d) all wrong

7. A: Did you hear our boss gave John a promotion instead of Sarah?
   B: I don't believe it. He _____ such a foolish decision.
   (a) better should have known to make than
   (b) better should have known than to make
   (c) should have known better to make than
   (d) should have known better than to make

***promotion: 승진, 진급**

8. A: You must be very proud of your little brother.
B: Oh, I _____. He's a great little kid.
(a) will (b) am (c) do (d) can

9. A: I _____ with your tardiness in this class.
B: Sorry, I have been having trouble with my babysitter.
(a) disappointed (b) am disappointed
(c) have disappointed (d) was disappointed

***tardiness: 늦음, 지각**

10. A: Is there anything I can do for you?
B: Please don't forget _____ me to take a pill with each meal.
(a) telling (b) to tell (c) of telling (d) to have told

11. A: Let's go see a movie tonight.
B: No, I'd _____ rather stay in and rent a video.
(a) little (b) less (c) much (d) more

12. A: The mosquitoes are driving me nuts.
B: Me too, I _____ a thousand times by them.
(a) bit (b) am bitten
(c) have bitten (d) have been bitten

***drive someone nuts: - 을 (성가시게) 화나게 하다**

13. A: Your new secretary seems to be doing a great job.
B: Yes, I've been pleasantly surprised.
_____ such initiative.
(a) A new employee takes rarely
(b) The new employees do take rarely
(c) Rarely do new employees take
(d) Rarely the new employee takes

14. A: Your shirt looks really dirty. I think it needs _____.
B: But I've got nothing else to wear. All my other shirts are even dirtier.
(a) being dry-cleaning (b) dry-cleaning
(c) to dry-clean (d) dry-cleaned

15. A: What _____ ?
B: Well, this restaurant is famous for its fried fish.
(a) I order would you suggest
(b) would you suggest I order
(c) suggest you I would order
(d) order I would suggest you

16. A: Can we meet a bit _____ ?
B: Sure, what time do you want exactly?
(a) late as we planned this evening
(b) later than we planned this evening
(c) late this evening as we planned
(d) later than this evening we planned

17. A: Is the report done yet? I need it before the end of the week.
B: I promise it _____ by Friday.
(a) is finished (b) was finished
(c) has been finished (d) will be finished

18. _____ in an environment of orthodox Puritanism, he demonstrated an interest in theology at a young age.
(a) Raised (b) Raising
(c) To be raised (d) Having raised

***orthodox Puritanism: 정통 청교도주의**
***theology: 신학**

19. I'll buy you a digital camera when I _____ paid.
(a) get (b) will get (c) got (d) had got

20. Sam misses his deceased wife so much that _____
(a) it hurts (b) he hurts
(c) he is hurt (d) hurts him

***deceased: 죽은, 고(故)-**

21. Embarrassed, the professor pleaded not guilt to the charge of driving while _____ .
(a) intoxicate (b) intoxicated (c) intoxicating (d) to be intoxicated

***plead: 간청하다, 탄원하다**
***intoxicate: (술에) 취하게 하다**

22. Students who do not finish their thesis by _____ deadline will not be able to attend the graduation ceremony.
(a) the May (b) a May (c) May (d) in May

23. Jason is one of those people who would succeed in _____ profession he chooses.
(a) what (b) which (c) whose (d) whatever

24. It is risky to promote a diet _____ primary goal is weight loss rather than nutrition.
(a) whose (b) which (c) that (d) its

***nutrition: 영양**

25. Several factors must _____ consideration before we make a final decision.
(a) take into (b) be taken into
(c) have taken into (d) have to be taken into

26. They had passed the course, _____ they thought it didn't matter if they returned to class or not.
(a) because (b) so (c) though (d) when

27. If he had ever suspected the difficulties involved in the task, he probably _____ it.
(a) will never undertake
(b) would never undertake
(c) had never undertaken
(d) would never have undertaken

28. In ancient times, criminals' hands might be cut off or _____ as a punishment.
(a) their scalps removed
(b) to remove their scalps
(c) removing their scalps
(d) they would scalp them

***scalp: 두피, 머리가죽**

29. My wife is so overweight; it's time she _____ some exercise.
(a) does (b) will do (c) has done (d) did

30. Shakespeare's portrayal of violence in its many facets _____ convincingly real.
(a) making it (b) which made
(c) made it (d) making

31. With his research _____, no one would be able to deny his academic credentials any longer.
(a) scientifically confirming
(b) to be confirmed scientifically
(c) having scientifically confirming
(d) having been scientifically confirmed

***credentials:** 자격, 업적

32. A soldier's gear could weigh _____ or more than the soldier himself.
(a) as much (b) as much as (c)much (d)much as

33. Only so long as students exemplify excellent academic achievement _____ a scholarship.
(a) they are presented with (b) do they present
(c) do they present with (d) are they presented with

34. By the time they put out the fire, the church _____ down to ashes.
(a) burnt (b) was burning (c) had burnt (d) having been burnt

35. _____ forms of begging sometimes found amusing by tourists offend many locals.
(a) Other (b) Another (c) Others (d) The other

36. Unless there are sufficient warnings _____ about the drug, more and more young people will take it thinking it is safe.
(a) giving (b) gives (c) gave (d) given

Please choose <u>one</u> incorrect expression in a given dialog or passage.

37. (a) A: It must be lunch soon. Do you have the time?
(b) B: No, I'll skip lunch.
(c) A: I mean, what time is it now?
(d) B: Sorry, I don't have watch.

38. (a) A: You look worried this morning.
(b) B: I got the results from my medical tests last month.
(c) A: How did they turn out?
(d) B: The doctor said I am having high blood pressure.

39. (a) A: Fiona, can you come to our meeting on Friday?
(b) B: That depends. When exactly are you having it?
(c) A: We're planning on having it around noon.
(d) B: Okay. I'll check my schedule and get back you.

40. (a) A: You cooked really delicious dishes last night.
(b) B: But I don't want cooking again.
(c) A: Why not? Everyone enjoyed it.
(d) B: It took five hours of cleaning up after the guests left.

41. (a) A: Making delicious spaghetti isn't an easy task to do, is it?
(b) B: Not at all. I really need some help.
(c) A: If Mary was her now, she would show you how to cook.
(d) B: That's for sure. She is such a wonderful cook.

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This dissertation was typed by the author.